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PRINCIPLES AND PRACTICE OF COST ACCOUNTING

FOR

**ACCOUNTANTS, MANUFACTURERS, MECHANICAL ENGINEERS,
TEACHERS AND STUDENTS**

BY

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1915

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PREFACE.

This work has for its object a comprehensive and practical presentation of the general principles upon which cost accounting for manufactured articles is based, the application of these principles in a general manner to the most common types of manufacture and the illustration of the details. These latter vary so greatly under different manufacturing conditions, and may become so numerous and complex that any work on this subject would seem incomplete which did not deal thoroughly with them. However, no one book, on even manufacturing cost alone, could hope to cover the subject in its entirety.

Repetition, and reference to other sections, will be found in the text, but, for the sake of clearness, this could not be avoided.

The subjects of "Efficiency Engineering" (more properly, but less commonly spoken of as "Factory Management") and Cost Accounting are herein considered as distinct, since the accountant is seldom the master of both; but properly speaking, the subjects are very closely related. The subject of "Efficiency" should be studied from works of competent writers and will be of great value to the cost accountant.

Cost finding is best considered from the viewpoint of the method of manufacture, and not from the idea of a set system.

It is the aim of this work to illustrate the principles by methods which eliminate from the financial accounts and segregate the quantities and values used on the manufactured goods into accounts known as the cost accounts. Printed forms are used, wherever possible, to take care of the analytical work.

The objections raised by many manufacturers to the installation of a system of cost finding has been due, in many

cases, to the number and complexity of the books and forms proposed and the extra labor incidental to their keeping. The methods herein outlined call for little, if any, addition to the books which a corporation should ordinarily possess for the recording of its transactions.

The numerous forms, such as those used for time clocks, payroll books and analyses, production orders, requisitions, material transfers, etc., have not been illustrated. They are rarely of any practical value when applied to a business other than that for which they were especially prepared and, when one knows what data are required, they are easily formulated.

It is hoped that the following treatise may be helpful to those interested in cost accounting, and that the ideas are so conveyed that they may be entirely clear and adaptable.

THE AUTHOR.

Baltimore, Md., November, 1915.

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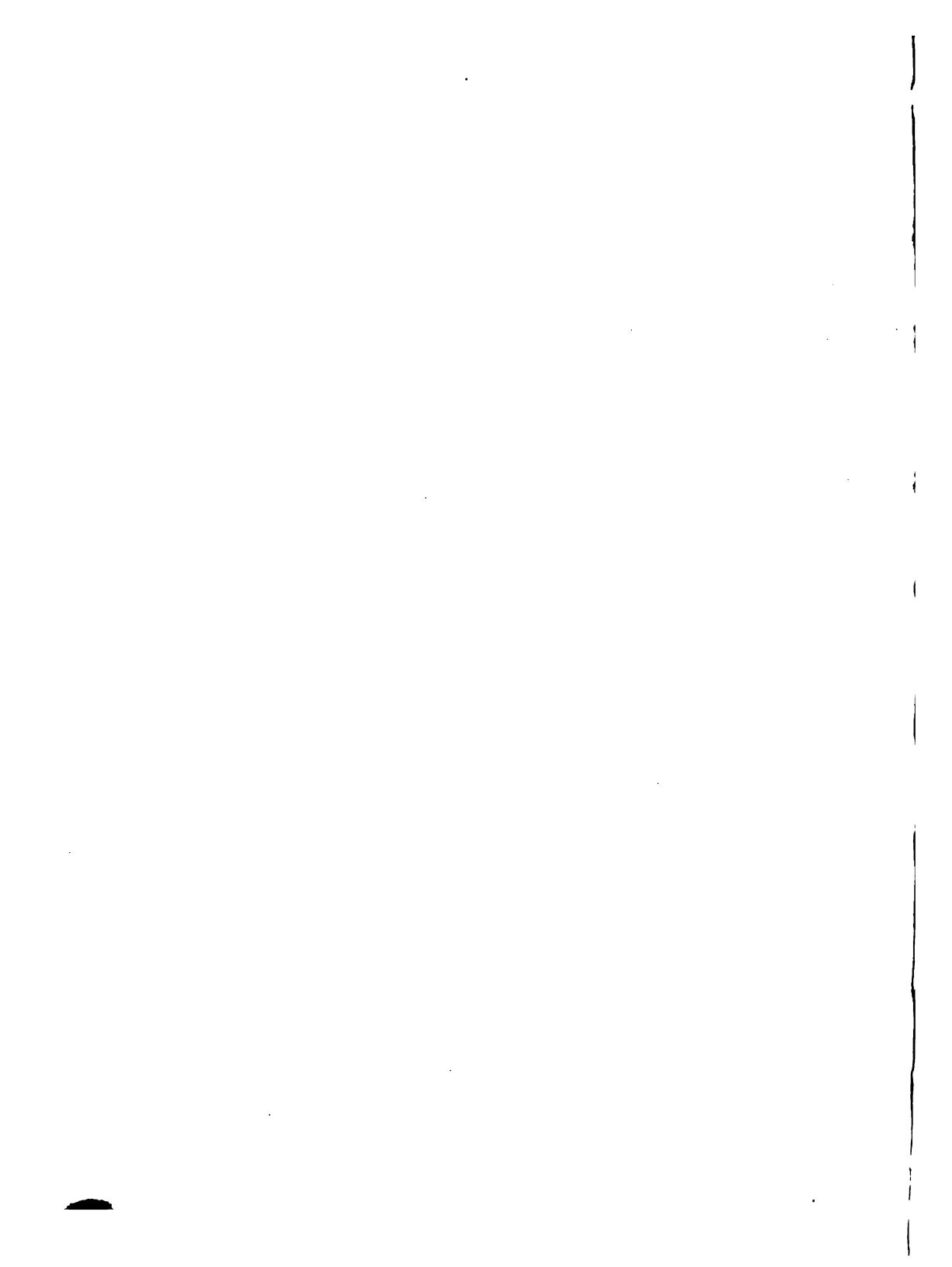
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PRINCIPLES AND PRACTICE OF COST ACCOUNTING

INTRODUCTION.

1. General Remarks. In treating of the principles of cost accounting, it must be borne in mind that the field of manufacture or production is a wide one, and that the facts and conditions to be met with in each case are usually peculiar to that case.

No attempt will be made to embody the numerous wage plans, efficiency tests, cost accounting systems, etc., which are usually embraced in books on cost accounting.

2. Cost Defined. In general terms, and for present purposes, cost may be defined as the total expenditure made to produce or manufacture some product, and to dispose of it.

The expenditure is relatively expressed by a unit of cost; or by a number of such units where the finished work cannot be referred to one standard of measure. The standard of measure may refer to the product, or it may refer to the actual time consumed in producing the product.

3. Cost Accounting Defined. All accounting has for its object the recording of the operations so that the financial status and the expense of the undertaking as a whole may be ascertained.

Cost accounting does not supplant this condition, but becomes a secondary, but no less important, stage of the accounting.

It takes up the items of expense and material expenditure

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where the ordinary accounting stops and, through a series of analyses, ascertains the cost analytically of each brand, department, process or article. Due to the analyses required, and the necessary reconciliation of the cost figures with the figures contained in the financial books, the cost accounting requires certain entries to be made which would not be apt to occur where the ordinary accounting only was in force.

The real value of the cost accounting is found in a close analysis of the various contributing expenses, their classification, proper apportionment and application to the manufactured products, and finally, the assembling of these analyses in proper statistical form in order that the proportion of each contributing classified factor to the total cost may be shown.

The cost accounting follows a logical sequence of events from the reception of the material put into process or work and the expense attendant thereon, direct and indirect, until the article or work is finished and disposed of.

4. The Object and Advantage of a Cost System. The primary object of ascertaining the cost of a manufactured article is to enable the manufacturer to quote the lowest selling price. The latter must be arrived at by adding to the cost the necessary or desired profit. Competition cannot be intelligently met without a knowledge of costs.

It is equally important to know whether the rate of cost runs evenly from month to month. If the cost varies, the contributing causes should be discovered.

To reduce the cost of manufacture is the aim of all manufacturers, and efforts are constantly made in that direction. A monthly comparison of cost rates and production will clearly show the results of these efforts.

5. Duties of the Cost Accountant. It is the duty of the cost accountant to show the cost in such a manner that the results may shed the most possible light on the efficiency of the operations, or the lack of it. He should pay especial attention to

see that the inventories of raw material stock, raw material in process, finished material and manufactured (finished) goods are correct. Any discrepancies in material or marked variations in cost rates should be at once reported to the factory manager in order that the cause may be studied and remedied.

A perfected system of cost finding is the result of unremitting labor, thought and attention to detail. A working basis must be first obtained and, from that point, the refining of the system must be accomplished gradually.

6. Books and Forms Needed. The books used are those ordinarily possessed by a company, such as the cash book, journal, voucher record, general ledger, pay roll book, sales book, etc. In addition to these, there may also be the cost journal and cost ledger. For recording stock, a stock journal and stock ledger are used.

Forms are used for the cost work in order to obtain the required analyses relating to the values and quantities put into work, and remaining on work in process at the end of the month, and values and quantities charged to manufactured goods during the month. Forms are also used for the analyses of labor, the general expenses, raw material stock and finished material stock.

7. Relation Between Factory Management and Cost Accounting. Efficient operation is the prime essential to the success of any undertaking. A knowledge of factory management should embrace many subjects, such as the handling of men, a thorough knowledge of machinery, economics, the nature and composition of the articles manufactured, time and motion studies, etc.

In order to establish the results of the constant efforts made to render the factory more efficient, a system of cost finding is necessary.

8. What the System Must Show. The relation between the product and the expenditure (direct and indirect) made to

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produce and dispose of it is expressed by one or more units of cost, each based on some definite measure (pounds, yards, time, pieces or thing). An increase or decrease in any one of the contributing classified expenses will be reflected by a variance in the total rate of cost. The cost should, therefore, be shown analytically, in order that any variance may be traced to the source.

9. Interest as an Item of Cost. Some authorities on accounting hold that interest is not a charge applicable to the cost of the manufactured products.*

Interest on bonds covering plant is nothing more or less than a form of rental and must be met out of the proceeds of the sales of the business. If it is not recognized as a part of the cost of the product, it must be added to the selling cost before the selling price can be fixed. As to which method is right, and which is wrong, each individual must decide for himself, taking into consideration the facts in the case.

In this work, all items of expense are considered to be a part of the cost of the product.

A claim for fire insurance, for instance, would be based on the full value of the goods in process.

The United States Government refuses to recognize on the annual returns made to it by a corporation, for the purpose of establishing the corporation tax, the item of rent if not actually to be paid to the lessor, nor the item of interest in any form (except rent), as a part of the cost of manufacture. Provision is afterward made, with certain restrictions, for the deduction of interest. A charge for rent, where the property is owned by the company, is not allowed by the Government either as a part of the cost of manufacture or as a deductible item in arriving at net profits. Where such items have been included, adjustments should be made on the returns for taxable purposes.

*For discussions on this subject see "Cost Accounting," by Nicholson.

10. The Period for Which Cost Is Calculated. Cost is usually calculated on the operations for the calendar month.

Where it is calculated on the basis of the four weeks, it is in order to avoid splitting the pay roll which covers the end of one month and the first few days of the next. In avoiding this, the same difficulty may be encountered elsewhere.

11. Obtaining the Cost Data. In obtaining the proper information for the cost work, much depends upon the foremen, the stock clerks and the workmen. Time must be turned in properly, true records kept of the cost and quantities of raw material received, and put into process, finished material or work turned out for the month and shipments.

To facilitate this, labor time tickets or sheets, production orders, requisitions and other forms are constantly used, and the information secured from these is properly recorded. The perpetual inventory also is essential.

12. Production Cost. By this is meant the operating or producing cost, as distinguished from office, administration and selling expenses. It is in the factory or operating end that the lack of efficiency is most apt to be discovered. Therefore, information as to the rate of cost for this stage of operations is important.

13. Supplementary Cost. By this is meant that portion of the cost incidental to general office, administration and selling expenses.

14. Selling Cost. This is the combined production and supplementary costs, and represents the cost of the product.

15. Selling Price. To the selling cost must be added the necessary or desired profit to be made, in order to arrive at a minimum or profitable selling price.

16. Separation of Production and Supplementary Costs. If an attempt is made to charge the actual production effort with only its proper proportion of expense, some very fine "hair-

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splitting" will have to be engaged in. Differences of opinion always exist where this occurs.

By apportioning such items as taxes, rent and insurance between the two costs, the classified production cost rates would be separately shown; but as the portion of expense charged to the supplementary cost is usually charged to the General Office Expense Account, thus losing its identity, the cost analysis would be misleading.

A clear analysis of the contributing items of expense, under selected classifications, is always of more value.

17. Inventories Essential. Correct inventories are essential to the accuracy of the work. For instance, material on hand at the first of the month, plus purchases during the month, less the inventory at the end of the month, is often used as the basis for arriving at the quantity and cost of material put into process or work during the month. Any inaccuracy will be reflected in the cost of production.

18. Inventory Valuations. For cost work, the inventory valuation of raw material stock is the price paid, plus the inward charges, if practicable and desirable. The discount allowed on invoices for prompt payment should not be deducted from the cost of material. It should be treated as other revenue and should not enter the cost work at all. This refers to "cash discounts" and not to "trade discounts."

The value of material in process is the cost value of the material, plus the proportionate labor cost and sometimes the proper proportion of the indirect expenses. Whether the indirect expenses should be applied first to work in process and then to manufactured goods, or applied only to manufactured goods, depends upon the character of the manufacture. Consideration will be given this further on.

The value of manufactured goods is based on the cost of raw material used, cost of labor and the indirect expenses applied.

19. Contributing Classified Items of Cost. The items of cost are classified according to the light which they will give on the operations, and the rate of cost for each classification (a grouping of some classifications may occur in ascertaining these rates) is afterward determined.

The classification in the financial accounts should be in accordance with the requirements of the cost analyses, in order that the correctness of the figures on these latter may be controlled.

20. Explanation of the Terms Used. In the explanation of complicated detail, it is essential that the language employed should be so specific in its meaning as to give rise to no ambiguity. As accounting terminology has, in many cases, failed to provide such words, it may be well to explain the intended meaning of certain terms used:

(a) **RAW MATERIAL.** By this is meant the material purchased and used as the base of manufacture.

(b) **PROCESS.** The term "process" signifies a particular operation performed at any stage of the manufacture. The stage is usually indicated by qualifying words immediately preceding or following.

(c) **RAW MATERIAL IN PROCESS.** This term is applied to the material which has been put into process and is to be considered as in process until it has emerged in a finished or saleable condition (except as to wrapping, packing, etc.).

(d) **FINISHED MATERIAL.** By this is meant the material received out of process under some designated brand, make, name, in a marketable condition (except for the wrapping of it). There may be a further assembling or mixing of a portion with other finished materials in order to manufacture some other product; the finished material may also be sold under its own product name. For this reason the "finished material" may be held as such pending disposition to be made of it.

(e) FINISHED MATERIAL ASSEMBLED OR MIXED. By this it is meant to indicate the manufacture of products out of a mixture, combination, or by joining of several "finished materials," each of which is a marketable product manufactured by the same company. For instance, a liquid compound, which is composed of other liquid products manufactured and sold under specific names by the same company, would only be classed as manufactured goods when finally wrapped. That portion remaining unwrapped would be in process.

(f) DEPARTMENT. This word is used to distinguish a distinct operation, the cost of which will be understood to apply not to a particular brand, style or make, but to all work passing through the "department."

The words "machine group" have a similar meaning, but are indicative of a machine hour rate of cost instead of a departmental man hour rate.

(g) WRAPPING. This word is used to indicate the operation of putting the finished material into packages and of also putting the packages into cases, after which the goods are placed in stock or shipped and classed as manufactured goods.

(h) MEASURE DIFFERENTIATED. Measure is "the extent, quantity, capacity, volume or dimensions of anything as ascertained by a certain rule or standard."

Where a measure of the product itself is meant, the word "quantity" will be used. Where time is to be indicated as the standard of measure, the words "time" and "hours" will be used. Where simply the word "measure" is used, it will be indicative of either time or quantity or both.

(i) TIME. Where the word "time" occurs, it will be understood to refer to hours and tenths of hours. Where minutes are spoken of, it will be understood that they may be expressed in tenths of hours. Anything less than six minutes is usually treated as one-tenth of an hour.

CHAPTER I.

SYNOPSIS OF THE FINANCIAL ACCOUNTING.

21. General Remarks. It is presupposed that any one taking up the study of cost finding has, at least, an elementary knowledge of ordinary accounting.

Ordinary or financial accounting is limited in scope to establishing the financial status of an undertaking. Debit and credit entries to classified accounts are the mechanism by which this is accomplished.

Cost accounting simply uses the figures resulting from these debits and credits as the bases for analyses, and, in order to make the financial accounting agree with the results of these analyses, causes further debit and credit entries. Cost finding compels recognition in the ledger accounts of:

- Value of work in process.
- Value of manufactured goods.

Ordinary accounting is entirely inadequate to accurately determine these values.

Financial accounting might, therefore, be considered as:

- (a) Ordinary accounting.
- (b) Accounting for cost

the actual cost work being a matter of independent analyses.

The purpose of this chapter will be to briefly explain the functional difference between the ordinary financial accounting and financial accounting for cost, the various books, the classification and interpretation of the accounts, and the reasons for the inadequacy of the ordinary accounting for administrative purposes.

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Ordinary accounting, brought to a maximum of efficiency, should provide each month for correct inventories of raw material (including inventory of material in process at that time). With this inventory as the basis, the value of material actually used on manufactured goods may be ascertained. Besides this, information may be kept as to the quantity of manufactured goods on hand, and the quantity of manufactured goods completed during the month. This information will only enable a clear statement of the approximate condition of the business as a whole. It will not take into account an analysis of the values of labor, incidentals and material expended on specific products or the values of labor and incidentals remaining on work in process.

GENERAL OUTLINE OF THE ACCOUNTING.

22. Collecting the Data in Convenient Form for Posting. The transactions of a business are too numerous for the posting of each individual item from the books of "original" entry to the respective accounts in the ledger.

To avoid this labor, columnar books are used and the total debits against each account for the month from any one source of entry may be posted, at the end of the month, directly to the proper account; likewise, credits to certain accounts.

23. Accounts Representing Assets. In speaking of assets, it will be assumed, for illustrative purposes, that the book and liquidating values are exactly equal. The capital invested in a corporation is of two kinds:

- Nominal capital.**
- Borrowed capital.**

The former is represented by the preferred and common stocks; the latter is represented by all other liabilities, except the liability of a declared dividend awaiting payment

(credits created by a charge to Loss and Gain Account or to Surplus Account, such as Reserve Accounts, Appropriated Surplus Account and Working Capital Account are not considered as liabilities, though they are constantly found under that caption). The above two classes of capital will be spoken of as "invested capital."

In corporation accounting, the question of capital and income is looked upon from one side only, i. e., that the integrity of the invested capital shall be maintained. To accomplish this, income may be appropriated from earnings and capitalized and considered as invested capital to the extent of its use in restoring the value of capital assets.

Earnings (income) appropriated for permanent investment (and not for stabilizing the value of the assets), such as additions and betterments, would be considered as invested income, and should be charged to and separated from the Surplus (Undivided Surplus) Account by entry, say:

Surplus Account
To Invested (or Appropriated) Surplus Account

Where a mere transient use of earnings or surplus is made, as in the purchase of the utilities of productive consumption, no entry is made to separate this from the Surplus Account.

In the former case, capitalization of the invested income may also occur by the issuing of additional or treasury common stock (at par equal in amount to the income capitalized), which is distributed pro rata to the common stockholders as a "stock dividend." The entries for this would be:

Surplus (or Appropriated Surplus) Account
To Stock Dividend No. 1 Account

and then, as the stock is issued and delivered:

Stock Dividend No. 1 Account
To Capital Stock Account

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For the sake of illustration, assets may be briefly classed as follows:

- (a) Permanent:
 - (1) Plant.
 - (2) Equipment.
- (b) Current, Transient or Changeable:
 - (3) Investments (outside—transient).
 - (4) Raw material stock.
 - (5) Supplies stock.
 - (6) Raw material in process.
 - (7) Labor on material in process.
 - (8) Manufactured goods.
 - (9) Accounts and bills receivable.
 - (10) Cash and prepaid charges.

Accounts representing the permanent assets should show the original cost, plus the cost of additions and betterments. Reduction for depreciation should be taken care of by "setting up" reserves under names which will easily identify their relation to the capital account which they offset. Money derived from the sale of assets should be credited, through the cash book, directly to the investment account.

Current, transient or changeable assets undergo a gradual transformation. Purchases or receipts are debited to these accounts, and they are credited at cost with withdrawals for manufacturing purposes.

24. Accounts Representing Liabilities. The liability of a corporation, in liquidation, in the regular order is generally as follows:

Satisfaction of mortgage or bonded indebtedness (borrowed capital).

Satisfaction of creditors (borrowed capital—except as to declared dividends awaiting payment).

Satisfaction of preferred stockholders (nominal capital).

Balance of assets, if any, to common stockholders (nominal capital and undivided surplus).

The liabilities may be briefly classed as:

- I. Capital—Nominal:
 - (1) Preferred Stock.
 - (2) Common Stock.
- II. Capital—Borrowed:
 - (a) Fixed:
 - (3) Bonded Indebtedness.
 - (b) Current or Transient:
 - (4) Accounts and Bills Payable.
 - (5) Accrued Charges (not yet paid).
- III. Created by a Charge to Earnings or Profits:
 - (6) Dividends Declared (awaiting payment).
- IV. Credits Created by a Charge to Surplus or Earnings:*
 - (c) Restorative:
 - (7) Reserves, etc.
 - (d) Additive:
 - (8) Appropriated Surplus not Capitalized.

The capital stock and bonded debt accounts should be credited with the outstanding obligations only. If the authorized amounts appear, parts of which remain unissued, Treasury Bond and Treasury Stock Accounts should be respectively charged with the unissued portions. Where a sinking fund is created out of earnings for the purpose of retiring an issue of bonds, the value of the property then remaining (after the bonds have been paid off) may be returned to Surplus Account; or, it may be again capitalized by another issue of bonds, or by an issue of stock.

Reserve Accounts, Appropriated Surplus Account and Undivided Surplus Account, all of which are created out of earnings, are not to be considered as liabilities, although custom makes it necessary to show the balances (credit) of these accounts on the balance sheet under that caption, and for that reason they are here discussed. Such accounts represent the

*Credits created by a charge to Surplus or Loss and Gain Accounts are not liabilities, except when such charges are capitalized by the issuance of stock in lieu of cash, or for dividends declared, awaiting payment.

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excess of assets over the liabilities. This excess, after all prior liens have been satisfied, belongs to the common stockholders.

Surplus may be subdivided into:

Appropriated Surplus (for betterments, additions, etc.).

Reserve Accounts (that portion which is in excess of the requirements).

Undivided Surplus (for emergencies and the declaration of dividends).

Where special appropriations from Surplus are made for the purpose of increasing the productive capacity of the plant, etc., it is usual (where such amounts are not capitalized) to charge Surplus Account and credit Working Capital Account or Appropriated Surplus Account. The remaining Surplus Account would then be known as the "Undivided Surplus Account."

Preferred and common dividends are a charge against the Undivided Surplus Account.

25. Nominal Accounts Representing Expenditures. These accounts are never assets, but represent the cost of the elements actually used in the process of manufacture. These accounts are such as:

General Factory Expense.

Repairs and Renewals.

Expired Insurance.

Rent.

Taxes (accrued).

Material Used.

The debit balances of all such accounts are closed, in ordinary accounting, directly into Manufactured Goods Account, this account being credited for all sales. To ascertain the correct profit standing to the credit of this account:

Sales	\$
Manufactured Goods Inventory	\$

Total	\$
-----------------	----

Less:

Debits to account	\$
-----------------------------	----

Profit for the period	\$
---------------------------------	----

In accounting for cost, the aggregate of the debit balances of the nominal accounts is used as the basis for the entry:

Manufactured Goods a/c
To Manufacturing a/c

Then, instead of closing the nominal accounts into Loss and Gain Account at the end of the year, they are closed into Manufacturing Account.

26. Nominal Accounts Representing Revenue. These accounts are never liabilities, but represent the revenue derived from various sources. The accounts are such as:

Sales.
Discount.
Other Revenue.

Revenue other than that credited to Repairs and Renewals Account, for the sale of displaced parts, rarely plays any part in the cost analysis.

In ordinary accounting, Sales Account would be closed into Manufactured Goods Account, or Manufacturing Account (depending upon the name given the account); the balance of the revenue accounts would be closed into Loss and Gain Account, into which would also be closed the balance of the Manufactured Goods Account.

In accounting for cost, all revenue accounts are closed directly into Loss and Gain Account.

27. Evaluation of the Elements of Manufacture. Production originates with cash or credit, or both as the basis. The raw material is then purchased (plant requirements are excluded from consideration here). After this, the manufacture proceeds and cash must be expended for labor and other factory and office incidentals. The value of the cash is then represented by these expenditures under different classifications. As these expenditures are closed into Manufactured Goods Account, the value is expressed as "Manufactured Goods." As

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these goods are sold, cash is eventually received and the cycle continued—the profit being credited to Surplus Account, and the capital being retained for turnover, or used to liquidate the liabilities.

Ordinary accounting is entirely inadequate to undertake this evaluation. Brought to a high state of efficiency, it may include:

- (a) Monthly inventories of stock.
- (b) Monthly inventories of material in process.
- (c) Quantity of production.
- (d) Monthly inventory of manufactured goods on hand and quantity.

And this would be possible, as to items (c) and (d), only where standard articles were being made. To compute accurately the analytical value of the manufactured goods, to say nothing of specific products, a system of cost finding is absolutely necessary. The vital data lacking in ordinary accounting are:

- (e) Value of labor on work in process.
- (f) Value of incidental expenses apportioned as a charge against the work in process.
- (g) Specific and general apportionment of charges against specific products.

These data would have to be obtained from the cost analyses and, after the values were established for items (e) and (f), would cause entries to be made in the financial accounting in order to retain these values as assets.

BOOKS USED.

28. The Voucher Record (Page 18). This columnar book, as per illustration, is used for the journalizing of all accounts payable; the entries are made from properly prepared vouchers, or at least from original bills bearing authority for payment. The pay rolls are also entered and could be distributed in this book by the use of an additional "Sundry" credit col-

umn. On account of the number of columns necessary, it is usual to use a folio page with an insert sheet "short paged" from the margin separating the "Discount" column from the first debit column. This book should be closed monthly and the totals of the figures posted to their respective accounts. Bills on which a discount is allowed should be entered net in the Accounts Payable column, the discount being entered in its own column.

29. The Journal. This book may or may not be columnar. Where a voucher record is used, the necessity for a columnar journal is usually avoided. The entries in the journal would be mostly confined to :

- (a) Correction of errors in distribution.
- (b) Debits and credits of Branch to Home Office.
- (c) Debits and credits for monthly proportion of expired, accrued or deferred items.
- (d) Debits and credits for supplies used.
- (e) Entries based on figures obtained from the cost analyses.

30. The Cash Book. On the debit side of this book, the items will be mostly confined to entries concerning Accounts Receivable Account, and for these one column should be reserved. The other debit entries will be few in number and will consist mainly of revenue derived from miscellaneous sources.

CASH			JANUARY, 1915.		
Dr.			Cr.		
	Accts. Rec.	General.		Accts. Pay.	General.
Balance.....		1,000 00	Voucher No. 2	310 00	
John Jones....	500 00	10 00	Voucher No. 8	800 00	400 00
Scrap Sale....			Balance.....		
	\$500 00	\$1,010 00		\$1,110 00	\$400 00
Balance.....		400 00			

31. The Stock Ledger. Each class or style of material is allotted an account under distinguishing name. The pages should be ruled so that debit columns may provide information as to date of purchase, quantity, price and gross cost. The

VOUCHER RECORD.

Month of January, 1915.

(Section 28)

credit columns should provide for date of disbursement, requisition number, quantity disbursed, price charged and cost. The entries to the debit of these accounts are obtained from the invoices. The credits from the requisitions.

STOCK LEDGER.
RAW MATERIAL No. 1.

1915.				1915.			
Jan.	1	600	.20	120 00	Jan.	5	No. 415
	15	900	.21	189 00		20	No. 600
	22	500	.24	120 00			100 00
							104 00
					31	Balance on hand....	
						1000	.22½
							225 00
						2000	
							\$429 00
Feb.	1	1000	.22½	225 00			

32. The Stock Journal. The entries to the stock ledger are made from the stock journal. The invoices furnish the basis for the entries as to debits. At the end of the month, the raw material disbursed, returned to stock, damaged in stock, and discrepancies in the inventory will cause additional entries.

33. The General Ledger. In this book all accounts of the business are kept and these represent, under suitable classification:

- (a) Assets (debits).
- (b) Values used in manufacture (debits) or losses.
- (c) Liabilities (credits).
- (d) Revenue (credits) or profits.

The classification of the accounts should be so arranged that the status of the undertaking may be intelligently and readily grasped. The accounts should be general and not detailed. Where detail is necessary—as in Accounts Receivable Account—subsidiary books should be used. Such accounts in the general ledger (where the detail is taken up in subsidiary books) are known as "controlling accounts."

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INTERPRETATION OF THE ACCOUNTS.

34. The Trial Balance and Loss and Gain Account. Since every debit must have in value a corresponding credit, the net debit balances of all accounts in the general ledger must equal the net credit balances. The trial balance is a proof of the correctness of the posting and footings, and furnishes the basis for compiling the Loss and Gain Account and the Balance Sheet.

The following illustration of a trial balance will be based on both ordinary financial accounting and financial accounting where cost finding is carried on.

It will be assumed that the ordinary accounting provides for inventories of material in stock and in process, pounds of goods manufactured for the period, pounds remaining in stock and pounds sold; also, that only the monthly proportion of accrued or prepaid charges is used. This will bring the ordinary accounting to its highest possible state of efficiency. It will not take into account as an asset:

Value of labor on work in process.

Value of general expense applied to work in process.

As a result of this, the profit ascertained under the ordinary method will be different from the profit shown by the other.

At best, the ordinary accounting will only approximate values and give an approximate average rate of cost which must be applied to all products—regardless whether one costs 50 cents per pound and another \$2 per pound.

Cost finding will establish in the financial accounts the values in process, and the correct value of the manufactured products. On the cost analyses it will establish the analytical cost of each specific product and thus permit of a close analysis of profits.

TRIAL BALANCE.

Ordinary Accounting.	Debits.	Accounting for Cost.	
		Values. Used	Values. Remaining
20,000 00	Plant and Equipment.....		20,000 00
5,000 00	Cash		5,000 00
1,500 00	{ Raw Material Stock.....		1,000 00
	{ Raw Material in Process.....		500 00
3,250 00	{ Labor		
	{ Labor on Work in Process.....		250 00
50 00	Labor Used	3,000 00	
2,400 00	Prepaid Charges		50 00
300 00	Raw Material Used.....	2,400 00	
	Factory Expense.....		75 00
125 00	Factory Expense Used.....	225 00	
	Office and Selling Expense.....		25 00
See below	Office and Selling Expense Used.....	100 00	
	Manufactured Goods, 1,450 lbs.....		725 00
7,500 00	Cost of Sales, 10,000 lbs.....		5,000 00
	Accounts Receivable.....		7,500 00
\$40,125 00	Total Debits.....	\$5,725 00	\$40,125 00

Note: The separate trial balance of the cost accounts is obtained by the journal entry:

Manufactured Goods Account (11,450 lbs.).....	\$5,725 00
To Manufacturing Account.....	\$5,725 00
as per cost analyses.	

And also from the cost analyses:

Cost of Sales (10,000 lbs.).....	\$5,000 00
To Manufactured Goods.....	\$5,000 00

Credits.		
10 00	Reserve for Depreciation.....	10 00
25 00	Charges Accrued.....	25 00
8,000 00	Sales	8,000 00
5,890 00	Accounts Payable	5,890 00
1,000 00	Bills Payable.....	1,000 00
5,000 00	Bonded Debt.....	5,000 00
200 00	Dividend No. 1 (declared, not paid).....	200 00
20,000 00	Capital Stock	20,000 00
	Manufacturing	5,725 00
\$40,125 00		\$5,725 00
		\$40,125 00

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By the ordinary method of accounting it would then be necessary to transfer the balances of the expense accounts and the balance of the Sales Account into an account as follows:

MANUFACTURED GOODS ACCOUNT.

	Dr.	Cr.
Raw Material Used.....	2,400 00	
Labor	3,250 00	
Factory Expense.....	300 00	
Office Expense.....	125 00	
Sales		8,000 00
Inventory of Manufactured Goods on hand, 1450 lbs.....		769 31
Transferred to Loss and Gain.....	2,694 31	
	<hr/>	<hr/>
	\$8,769 31	\$8,769 31
Balance (Inventory).....	769 31	

Note: To ascertain the value of manufactured goods on hand it would be necessary to divide the debits by the total pounds manufactured (11,450 lbs. divided into \$6075.00 equal to \$0.530569 per lb., or 1450 lbs. multiplied by \$0.530569 equal to \$769.31). This, however, does not take into account the expense proportion held back as a charge against work in process. Consequently, the rate obtained is not a true value to be applied to the manufactured goods inventory.

LOSS AND GAIN ACCOUNT.

Ordinary Accounting.		Accounting for Cost.	
Dr.	Cr.	Dr.	Cr.
	2,694 31	Manufactured Goods Account.	
		Cost of Sales.....	5,000 00
2,694 31		Sales	8,000 00
		Balance (Profit).....	3,000 00
<hr/>	<hr/>		<hr/>
\$2,694 31	\$2,694 31		\$8,000 00
			\$8,000 00

The difference in profit is due to the inability of ordinary accounting to retain the expense values of labor and incidentals as a charge against work in process. Of course, a guess could always be made as to this and an entry could be made based on it.

An analysis of profits would be impossible, since the cost of specific products would not be known under the ordinary

accounting. In accounting for cost, the profit on specific products may be ascertained.

35. The Balance Sheet. Only values which represent either assets (debits always) or liabilities (credits always) appear upon the Balance Sheet (except the items of a deficit or a surplus, as explained in Section 24). To prepare this, the trial balance should show actual inventory values. From the trial balances in the preceding section, the following Balance Sheets are made up:

BALANCE SHEET.

Assets.

	Property Account:	
	Plant and Equipment.....	20,000 00
19,990 00	Less reserve for depreciation.....	10 00
		19,990 00
	Current Assets:	
	Goods in Process:	
	Material	500 00
	Labor	250 00
	General Expenses.....	100 00
		850 00
1,500 00	Raw Material Stock.....	1,000 00
769 31	Manufactured Goods.....	725 00
7,500 00	Accounts Receivable.....	7,500 00
50 00	Prepaid Charges.....	50 00
5,000 00	Cash	5,000 00
\$34,809 31	Total of Assets.....	\$35,115 00
	Liabilities.	
	Capital:	
5,000 00	Bonded Debt.....	5,000 00
20,000 00	Capital Stock.....	20,000 00
	Current:	
5,890 00	Accounts Payable.....	5,890 00
1,000 00	Bills Payable.....	1,000 00
25 00	Charges Accrued.....	25 00
200 00	Dividend No. 1, awaiting payment.....	200 00
2,694 31		
	Surplus:	
	Sales	8,000 00
	Cost of Sales.....	5,000 00
		3,000 00
\$34,809 31		\$35,115 00

CHAPTER II.

PRINCIPLES OF COST ACCOUNTING.

36. General Remarks. It is essential that the method of manufacture should be thoroughly studied and understood before an attempt is made to formulate the method of cost finding. A brief consideration of this subject will, therefore, be taken up at once.

It is necessary to begin with the base, or raw material, used for the manufacture and follow it from the time it leaves the storeroom to be put into process until the manufacture is completed and it is placed in stock as manufactured goods.

The processes to which the raw material may be subjected are:

- (a) Raw material entering process, or processes, leading directly to the finished article.
- (b) Raw material entering process from which it emerges in several forms (as in the case of by-products).
- (c) Raw material entering process from which it emerges as finished material and may be combined or mixed with other finished materials to produce another distinct product.

37. Processes Defined. The processes to which the raw material may be subjected may be physical or chemical in their nature, and have for their purpose the production of a saleable article.

During these processes, alteration takes place in the raw material and the incidental result is either waste or added value, or both.

38. By-Products, Waste and Scrap. Where the raw material is not entirely consumed in the manufacture, waste is utilized

in some manner, if it is possible to do so. If it can be made into other products, or sold directly as a marketable product it is known as a "By-Product." If it has no real product value it is known as "Scrap," and may be sold for a nominal sum and ignored entirely in the cost work. Revenue derived from it is then treated as "other revenue," and is not deducted from the cost of production.

Where the eliminated material is a "by-product," the cost of obtaining it should be apportioned between it and the product from which it was eliminated.

39. Means of Production. The first essential for productive ability is, of course, cash or credit. The means of production are:

- (a) Raw Material.
- (b) Power.
- (c) Machinery and Tools.
- (d) Labor.

The incidentals of the manufacture are the expenditures for repairs, renewals, insurance, salaries, sundry factory expenses, office expenses, administration and selling. Labor may be expended directly upon the product, or it may be general.

40. Cost of Manufacture. Capital expenditures, such as for machinery, tools and plant, enter into the cost work indirectly. Interest payments on the capital invested are accrued for the cost period and charged to that period. An annual provision is made for depreciation on tools, machinery and plant and one-twelfth of the amount determined upon is charged to the cost work of each month.

Labor, raw material and power are charged to the cost work as used.

The incidental expense may be charged out for the month entirely against the manufactured goods, or it may be charged proportionately to work in process and to manufactured goods.

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The monetary value of an article, therefore, consists of:

- (a) Value of the raw material put into it.
- (b) Value of the labor expended directly upon it.
- (c) Proportionate value of the indirect labor.
- (d) Proportionate value of the general factory expense.
- (e) Proportionate value of the general office expense.
- (f) Proportionate value of the selling expense.

41. Interest on Capital Employed, Rental and Maintenance.

Repairs and renewals and reserves for depreciation are of the maintenance class and should be included in the cost work. Rent may be in the form of an actual payment by the lessee to the lessor, or, if the property is owned by the company, may take the form of a self-imposed rental or interest on plant, which would cover the interest on the actual capital invested or on the bonds put out for the acquisition of the property.

In fixing a rental of this latter kind, it should be based only on the value of the money invested and at a nominal or current rate of interest. If it is made to cover repairs, taxes, etc., these charges would be duplicated.

Discount paid on money borrowed, discount allowed to customers for prompt payment, or discount received for prompt payment on purchases is all interest. The discount received for the prompt payment of invoices is excluded from the cost work and treated as other revenue. Other discounts enter into the cost work.

42. Stages of Cost.

Cost is divided into two stages, as shown below, together with a brief analysis of each:

I. Production Cost:

- (a) Prime, flat or direct cost:
 - (1) Material used, at cost, plus inward charges.
 - (2) Direct labor.
 - (3) Chargeable expenses, such as the expense of designs and patterns designed especially for and used on a particular job; an item of travel expended on a job after it has been contracted for.*

*"Cost Accounts," by Whittem Hawkins.

- (b) Works or factory overhead:
- (4) Indirect or miscellaneous labor.
 - (5) Factory supplies.
 - (6) Power, fuel, light, etc.
 - (7) Repairs and renewals.
 - (8) Salaries of supervisory workmen and men.
 - (9) Proportionate share of taxes, rent (including interest on plant), insurance, etc.
 - (10) Shipping-room expense.

II. Supplementary Cost:

- (c) Office Overhead:
 - (11) Salaries of clerks, etc., not connected with factory supervision or work.
 - (12) Proportion of depreciation, taxes, rent and insurance affecting office.
 - (13) Interest on loans and sundry office expenses.
- (d) Administration:
 - (14) Salaries of executives.
- (e) Selling Expense:
 - (15) Salaries and commissions paid to salesmen.
 - (16) Traveling expenses.
 - (17) Advertising.

In speaking of "direct labor" (item 2 above), in Departmental Cost the total wages of skilled operators are charged, as a matter of convenience, against the department as "direct labor," while only the productive hours are counted in ascertaining the labor rate of cost per hour. As a practical proposition, this saves much time and labor over the method of separating productive from unproductive wages. Miscellaneous labor should not be confused with "unproductive labor."

43. The Unit of Measure. The measure may be expressed per 100 pounds, one hour of productive time, one yard, one piece, etc. The unit of measure will usually be found to correspond with the measure on which the selling price of the product is based.

44. The Unit of Production. This is the particular brand, job, article, style or type of finished goods produced. Manu-

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factured specific parts of an article may also be sold separately and classed as units of production until they have become incorporated in the assembled article.

45. The Unit of Cost. The unit of cost is the cost per hour, per pound, per piece, etc. The cost of the completed work may sometimes be expressed in terms of a single unit of cost based on a unit of measure other than the entire article itself, as for instance, 10 cents per pound.

On the other hand, the cost of the completed work may have to be expressed departmentally by several units of cost, each rate of cost being based on a specific departmental hour as the unit of measure, exclusive of the material used. For example, Job No. 51 costing:

50 cents per hour in Department A.
30 cents per hour in Department C.
\$100, cost of material used.

At times the unit of measure is the finished article and the unit of cost the entire sum expended on its production.

46. Basing the Cost. The basis for the cost calculation may be the:

- (a) Productive labor hour (man hour).
- (b) Productive running hour (machine operating hour).
- (c) Measure of the product (pounds, yards, etc.).

The productive hour must be used on work which is manufactured under specification and which is not uniformly reproduced. This may be either the man or machine hour.

Weight, number, liquid and linear measure are used for the manufacture of standard goods.

47. The Element of Reproduction As a Factor. The object is to obtain, as the unit of measure, one element which is common to all of the work and which is constantly reproduced.

If a common element cannot be found, two or more units must be chosen.

Where standard articles are manufactured there is constant reproduction, and consequently a measure of the product may be chosen as the unit.

In work done under specification from the buyer, there is no uniform reproduction, each job being different from the others. For this, the unit of measure chosen is the hour. As the cost of an hour in one department will be different from the cost of one hour in another department, the hours are distinguished under their department names.

48. Direct Cost. Where a minute analysis of cost is undertaken, direct cost becomes a matter of secondary consideration. See Section 42.

49. Indirect Cost. This includes all expenses other than those expended directly upon the work, as shown in Section 42.

50. Indirect or Overhead Expense Applying Specifically. Some items of overhead expense apply specifically to a certain department, brand, etc. These are charged, on the cost analyses, against the department or brand to which they refer.

51. Indirect Expense Applying Generally. Some items of overhead expense apply generally to all departments or brands. Such items as taxes, repairs and renewals to buildings, rent, etc. These items must be apportioned over all departments, or products on some equitable basis. (See Section 63.)

By one method of manufacture, an item of overhead may be general in its nature, while by another the same item might be charged specifically to some department or brand. Overhead applying specifically should be charged accordingly, thus reducing the residue—the general overhead—to a minimum.

52. Distribution of the Indirect Expense. The expenditures should be properly distributed to the classified accounts in the original entries. These classifications are selected according to the requirements of the cost data.

53. Apportionment of the Indirect Expense. From the classified expense accounts, the balances at the end of the month

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are listed and apportioned over the work in process, or over finished work, or both, as the case may be. (See Section 63.)

54. Methods of Manufacture and Forms of Organization Considered. Upon the method of manufacture depends the shaping of the system. The ultimate goal is an accurate cost rate. To obtain this, the intermediate steps must be accurate.

Where possible, organization into departments, types or groups of machines, processes, products, etc., is effected in order to segregate each important step in the manufacturing process.

The four most common cost finding conditions to be met with are given below:

(a) Manufacture under specification from the buyer, in which the cost of the materials used, processes and rates of wages vary so greatly for the different work undertaken as to preclude the possibility of department or machine group rates of cost.

(b) Manufacture adapted to departmental organization which will permit of a rate of cost being ascertained for each department or operation, or a rate of cost for the operation of identical types of machines. In this, the departmental or machine group rate is applicable to all of the work passing through the department or machine group. The rate of cost is exclusive of the material used.

(c) Manufacture of standard goods in which the raw material emerges from process for each product as finished material and needs no further operation except that of wrapping and shipping. Manufacture of flour would illustrate this.

(d) Manufacture of standard goods, in which the raw material emerges from process as finished (marketable) material of each product. Two or more of these finished materials may be assembled or mixed in order to obtain other distinct products. Portions of these finished materials may also be

sold without further process (except that of wrapping) under their own distinguishing product names.

55. Classification of Cost. Cost accounting may be classified as follows:

Specific Job Cost.

Departmental Cost.

Process Cost:

- (1) Simple Type.
- (2) Complex Type.

The application of the overhead is different in each of these classes:

(a) Specific Job Cost requires that the cost of each job must be ascertained independent of any machine or departmental rate. To do this, it is necessary to individualize each separate undertaking by a number. All material put into work is reported under the proper job number, as also all direct labor expended and chargeable expenses, if any. The indirect expense must then be apportioned and applied, at the end of the month, on some equitable basis, over the work in process, and a portion of this is afterwards charged to finished work. For methods of apportionment, see Section 63.

(b) Departmental and Machine Cost (which is only a form of Departmental Cost) usually include specific job cost, but the rate of cost established for each department or machine group for the month is applicable to each job for that period.

The overhead is first apportioned to the work in process and afterwards a portion of this is applied to finished work. For methods of apportionment, see Section 63.

The cost of each job is ascertained by multiplying the hours of each department or group expended on the job by the respective departmental or machine group rates. To this must be added the cost of the material used.

Both the man hour and the machine hour may be used in different departments or operations of the same factory, and may apply in part to the same job. The manufacture of stan-

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dard goods should not come under departmental or machine group cost.

(c) Process Cost—Simple Type. In the place of departments and jobs, there would here be processes and brands. The unit of cost for the manufactured product may be expressed per pound, per yard, per gallon, etc., and includes the cost of the material used. The product is never composed of a mixture of finished materials.

One rate of cost for the labor on raw material in process may sometimes be applied to each brand, where the material goes through the same processes. In this case, the overhead may be distributed over the products on the basis of production. For other methods of apportionment, see Section 63.

In this class of cost finding, the overhead is applied directly to the manufactured (completed) goods, and is not charged to work in process at all.

(d) Process Cost—Complex Type. Where the manufactured products consist of several finished materials which, when assembled or mixed, form some other distinct product, the method of cost finding is somewhat more complicated than in the Simple Type.

In this, the unit of cost is also based on a measure of the product. The labor on each class of finished material, and for the assembling and mixing, should be definitely ascertained.

The overhead is distributed, in this type, to the different classified finished material output as equitably as possible. The assembling or mixing is charged with only the overhead which definitely applies to that operation. The overhead which cannot be specifically linked with any special finished material or assembling is distributed over the finished material of each class on the basis of direct wages. The assembling expense may be distributed over the assembled articles in the same manner.

In this type of manufacture the work is mainly confined to products composed of several finished materials.

56. General Outline of the Accounts. The financial books must embrace, in some form, all items which appear upon the cost analyses. Classification of the accounts in accordance with the requirements of the cost data is essential. Used values should be segregated from values not used. The accounting process is, therefore, one of elimination. Material entering into the cost of production is at once eliminated from some stock account and charged to material in process, and from this latter to material used.

Labor is first applied to Labor on Work in Process, and the proper portion is afterwards charged out to Labor Used, this charge representing the labor used on manufactured goods. In some cases, labor value is first charged out from Labor on Work in Process to Labor on Finished Material and then to Labor Used.

The overhead charges are treated as follows:

(a) In Specific Job Cost and Departmental Cost, the net charges to the various overhead accounts are transferred each month respectively to :

Production Overhead on Work in Process Account.

Supplementary Overhead on Work in Process Account.

The cost analysis sheets will show how much of the overhead applies to work still in process at the end of the month and how much to manufactured goods. The portion applicable to manufactured goods is then credited, according to classification, to the above two accounts and properly classified cost accounts are charged.

(b) In Process Cost—Simple Type—the expense accounts as they appear in the financial books are all cost accounts, if the entire net overhead for the month is applied to the manufactured goods only.

(c) In Process Cost—Complex Type—the overhead must first be charged to finished material and then be charged out in the proper proportion to manufactured goods.

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A summary of the entire cost of manufacture is finally made, and this forms the basis for a journal entry:

Manufactured Goods Account.....	\$
To Manufacturing Account.....	\$

The former appears as an asset among the financial accounts and the latter as a contra entry or controlling account for the cost accounts, and effectually separates the two sets of accounts.

The cost of sales for the month is credited to Manufactured Goods Account and charged to Cost of Sales Account.

Accounts Receivable Account is charged and Sales Account credited with the total sales for the month.

In closing the books at the end of the year, all of the accounts containing used values (the cost accounts) are closed into Manufacturing Account, which will then balance.

Cost of Sales Account is closed into Sales Account and the balance of this latter account is transferred to Loss and Gain Account. The balance of Loss and Gain Account is then transferred to Surplus Account.

The effect of these entries is to cause the financial trial balance to contain only values which represent either assets or "liabilities," the difference between the two nominal accounts (Sales Account and Cost of Sales Account) being the addition to Surplus Account. Accounts containing items of "other revenue" would also represent additions to surplus.

The figures on the various cost analyses must always agree with such accounts in the financial books as:

- Raw Material in Process Account.
- Raw Material Used Account.
- Overhead on Work in Process Account.
- Overhead on Finished Material Account.
- Overhead Used Account.
- Labor on Work in Process Account.
- Labor on Finished Material Account.
- Labor Used Account.

57. Inventories. Properly classified inventories at the end of each month are absolutely necessary. These inventories consist of tangibles and intangibles. The correctness of the latter are absolutely dependent upon the accuracy of the former.

The tangibles are raw material in stock, raw material in process, finished material and manufactured goods.

The intangibles consist of labor value on material in process, labor value on finished material, overhead value on work in process and productive hours on work in process.

There are two common methods used to obtain inventories:

(a) As to tangibles, actual or physical stock taking, which is always the most correct method.

(b) As to tangibles or intangibles, by elimination, i. e., to the inventory at the first of the month add the expenditures made during the month, deducting from the total of these that which has gone into manufacture and the balance should, if the records have been correctly kept, represent the correct inventory of stock on hand.

58. Overhead or Indirect Expense Distinguished. As explained in Section 42, the stages of cost were divided into production cost and supplementary cost; the former showing the rate of cost for the operating effort, the latter the rate of cost for the office, administrative and selling effort.

Some general expenses are apportionable between factory and office and may, if desired, be apportioned very minutely, but, as no advantage is to be gained by this, it is best not to apportion such items, but to charge them to the supplementary rate of cost.

The vital distinction as to overhead is what part of it may be applied specifically and what part must be apportioned generally over the products, departments, etc., and, therefore, may be distinguished as being either specific or general, and, with limitations, as applying either to the production cost or the supplementary cost.

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59. Classification of the Accounts to Which Overhead Expense Should Be Charged. The function of the general ledger, in so far as the expense of the business is concerned, is to show, by classified accounts, the nature and amount of the expenditures. It is the function of the cost work to analyze these expenditures, or accounts, and to apply the values in the proper proportion to the various jobs, departments, brands, etc.

Each expense account in the general ledger should show the total expense incurred under its classification; otherwise the classification would be meaningless.

The overhead accounts may be of three kinds:

The nominal accounts which are charged in the original entries, no distribution of the balances being made.

The nominal accounts which are charged and the balances then distributed to other nominal accounts, making them statistical.

The classified cost accounts containing the overhead expense used on manufactured goods.

The best results on the cost analyses are obtained by not going into fine apportionments between production and supplementary overhead for such items as depreciation, repairs and renewals, interest on plant, etc., but to find the rate of cost for these contributions separately.

Where numerous redistributions occur in the accounts the analysis is always made more difficult, the book keeping more involved and the vital data less apparent.

60. Some of the Most Common Overhead or Indirect Expense Accounts. Below are given the names of some of the most common overhead accounts to be met with and the methods adopted in treating the balances in connection with the cost work:

(a) *Miscellaneous Labor Account.* Wages paid to unskilled workmen, or for work of a general character, are charged to this account. In Departmental Cost, miscellaneous labor is usually charged to the Department Expense Account, either directly, or, if general, after apportionment.

In Specific Job Cost, the balance of this account would be transferred, at the end of the month, to Overhead on Work in Process Account.

In Departmental Cost, the balance would be charged to the Department Expense Accounts.

In Process Cost—Simple Type—the account would be a cost account and no entry would be made to transfer the balance, unless for distribution to other accounts.

In Process Cost—Complex Type—the balance would be transferred to Overhead on Finished Material Account, if not distributed to some other account.

(b) *Insurance, Taxes and Rent Account.* These items may be found in separate accounts. The balance of this account may, at the end of the month, be distributed to other classified accounts, such as General Factory Expense and General Office Expense Accounts.

If this is not done, the balance should be apportioned, on the cost forms, over the various products or work and the rate of cost for this classification ascertained for each department, brand, etc., as it applies to them.

In Specific Job Cost, the balance would be charged to Overhead on Work in Process Account.

In Departmental Cost, the procedure would be the same as above.

In Process Cost—Simple Type—the account would be a cost account (representing value used) and the balance would not need any transfer.

In Process Cost—Complex Type—the balance would be transferred to Overhead on Finished Material Account.

(c) *Power Account.* This covers the expense of motive power. Power used for lighting, if any, should be credited to this account and charged proportionately to General Office Expense and General Factory Expense Accounts. Expense of heating may also be treated in the same manner. The remain-

ing balance could also be charged to the latter, thus closing this account. If it is desired to ascertain separately the rate for this contribution to the cost, treat the balance as in (b).

(d) *Interest on Plant Account.* This is practically the same as rent. It may be for the rental of the building or for the use of capital. The balance may be distributed to General Office and General Factory Expense Accounts, but if it is desired to find the rate of cost for this classification, treat the balance as in (b). The balance is apportioned on the cost forms over the work.

(e) *Repairs and Renewals Account.* This account covers repairs to buildings and equipment. At the end of the month the balance is apportioned, on the cost forms, over the work, and treated as described in (b).

(f) *General Factory Expense Account.* This account contains charges for miscellaneous supplies used (not chargeable to a department expense account) and sundry items of expense affecting the factory operating, and for which there is no other classification. Miscellaneous labor is sometimes charged to this account, as also shipping room expenses. At the end of the month, the balance is apportioned, on cost forms, over the work, and treated as described in (b).

(g) *Department Expense Account.* The name of the particular department to which the account refers should be prefixed for identification. To this account are charged such items as affect only the particular department, and for which no other classification is provided. No distribution or apportionment occurs. At the end of the month the balance is transferred to Overhead on Work in Process Account.

(h) *Depreciation Account.* The monthly charges to this account represents the provision for depreciation. At the end of the month, the balance is apportioned, on the cost forms, over the departments, products, etc., and the balance is charged out, if at all, as described in (b).

(i) *General Office Expense Account.* This account covers items of ordinary office expense, salaries of clerks and the proper proportion, if desired, of insurance, taxes, rent, etc., where such items are apportioned between the production and supplementary costs. The balance of this account is apportioned, at the end of the month, on the cost forms, over the work, and charged out, if at all, as described in (b).

(j) *Administration Account.* This covers salaries paid to executives. At the end of the month, the balance is apportioned, on the cost forms, over the work and charged out, if at all, as described in (b).

(k) *Selling Expense Account.* Expenditures for travel, commissions and salaries of salesmen, and advertising are charged to this account. It may be divided into several accounts for better analysis. At the end of the month, the balance is apportioned over the work and charged out, if at all, as described in (b).

(l) *Overhead on Work in Process Account.* After all charges have been made for the month to the regularly classified expense accounts, the balances are transferred, in Specific Job Cost and Departmental Cost, to the debit of this account. These balances are separately analyzed on a form similar to Form 2, Section 153, and when this analysis is completed, the amount of overhead used by each department on the manufactured (completed) goods or work will be seen in the total column, line d-12 and corresponding lines. An entry is then made crediting the total of these overhead items of each division to this account and charging an aggregate amount to the various cost accounts for their proportionate share. The balance remaining to the debit of this account will represent the overhead expense applying to work still in process.

(m) *Overhead on Finished Material Account.* This account would be used in Process Cost, Complex Type, and would be charged with the balances of the various overhead accounts

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(except those relating to assembling). Credit to this account would be made for that portion of the overhead which was used on completed (manufactured) goods, the various overhead cost accounts being charged. The balance remaining to the debit of this account, at the end of the month, will represent the overhead value contained in the finished material (see Section 140) not yet sold, assembled or packed.

(n) *Assembling Expense Account.* Overhead relating specifically to the assembling or mixing of finished material is charged to this account. The balance of this account should be charged out entirely to manufactured goods and, in that case, would not need any transfer as it would be one of the cost (used values) accounts.

(o) *Overhead Used Accounts.* Overhead is first charged to classified overhead accounts. Then, depending upon conditions previously described, the balances of some of these accounts may be distributed to other accounts. After this, the balances then standing to the debit of the various overhead accounts are either transferred to Overhead on Work in Process Account or to Overhead on Finished Material Account; or, where the overhead is applied directly to manufactured goods only, the accounts are cost accounts and no entry for the balances need be made.

In any event, the cost accounts should be classified in the same manner as the classifications appear upon the cost analysis, or according to the classified financial expense accounts.

To these cost accounts, containing used values only, are charged each month the respective portions of the overhead used on manufactured goods, credit being given to Overhead on Work in Process Account or to Overhead on Finished Material Account, as the case may be.

61. Charging the Indirect Expense. The distribution of the overhead (not the apportionment) should always be made in the original entry to the classified account or accounts to

which it belongs. If a distribution of a part of the balance is made, except for the correction of errors, the account should be closed out entirely so that no remaining balance may be used in the cost analysis under that classification. See Form 2, Section 153.

62. Apportionment and Application of the Indirect Expense. After all charges for the month have been entered upon the classified expense accounts, and after all redistributions, if any, have been made, the balances of the expense accounts should be ascertained. These balances are then analyzed and apportioned over the work or products on the cost analyses and the rate of cost is found for each.

In Specific Job Cost and Departmental Cost the balances of the overhead accounts are charged to Overhead on Work in Process Account, and from this account the overhead applicable to manufactured goods is charged to classified Overhead Used Accounts.

In Process Cost—Simple Type—the overhead accounts are all cost accounts, as no overhead is retained as a charge against work in process.

In Process Cost—Complex Type—the balances of the overhead accounts are first transferred to Overhead on Finished Material Account (except overhead relating to assembling). The portion used on manufactured goods is then transferred to properly classified used accounts.

For the apportionment and application of the overhead to brands, or departments, see Section 140, Form DD and Section 154, Form 3; Section 153, Form 2; Section 178, Form 18.

63. Methods Used for the Apportionment of the Indirect Expense. The overhead expense may be either specific or general, and is applied accordingly, where feasible. The general overhead should be reduced to a minimum. The specific relation to the work should be noted on the accounts payable voucher

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when making the original entry, or on the journal voucher for convenient reference when making the analysis of overhead.

The methods of apportionment most commonly used are given below:

(a) *Apportionment of Depreciation.* Depreciation of machinery may be specifically allotted by dividing the productive hours supposed or estimated to be contained in the life of the machine into the original cost, thereby establishing the rate per running hour for depreciation purposes. The number of operating machine hours for the month is then multiplied by this rate and this establishes the amount of depreciation applying to the particular machine for the month. This method may be applied to groups of machines instead of to individual ones. This method is most apt to be found in departmental cost finding.

Where depreciation is arrived at by other methods, as described in Section 67, it is usually treated as general overhead and apportioned on the basis of direct labor, departmental labor, production, time, etc.

(b) *Apportionment of Power.* The portion of this expense applying to departments, machine groups or processes is found by multiplying the horsepower of all machines of a department or group respectively by the actual number of running hours for the month of each. This gives the total horsepower hours for the month. The expense of running the power plant for the month, or buying the power, is then divided by the total horsepower hours of all departments or groups for month and this gives the rate per horsepower hour. The horsepower hours of each department or group, for the month, multiplied by the rate, will give the approximate specific charge to each.

(c) *Apportionment of Rent.* This item is apportioned on the basis of floor space.

(d) *Apportionment of Taxes.* These should be appor-

tioned on a percentage basis by one of the methods described in (g) and (h) below.

(e) *Apportionment of Insurance.* Insurance on buildings, stock, etc., should be treated as described in (d). Insurance on machinery may be apportioned according to the insured value of the machinery in each department, machine group, etc.

(f) *Apportionment of Repairs and Renewals.* Repairs to buildings may be treated as in (d). Repairs to machinery are charged specifically against the department or machine group. In Process Cost, repairs are usually a general charge and are apportioned as in (g) and (h).

(g) *Apportionment of General Overhead on the Basis of Labor.* For the apportionment of general overhead, labor may be used as the basis. For instance, if the wages paid in Department A amounted to \$400, and for Department B \$600, Department A would be charged with 40 per cent. of the overhead, and Department B with 60 per cent. This method might be applied to either Departmental or Process Cost.

In order to make the application easier for Specific Job Cost, if the total direct labor for the month amounted to \$1,000 and the total overhead was \$800, the amount of overhead to be applied to each job would be 80 per cent. of the direct wages expended on each.

(h) *Apportionment of General Overhead on the Basis of Production.* In Process Cost, where the labor costs for the different processes to which the products are subjected are the same, or nearly so, the distribution of the overhead may be made over the brands, or products on the basis of pounds, gallons, numbers, etc., of each product. For example:

If the total production was 1,000 pounds, to which Brand A contributed 400 pounds, and Brand B 600 pounds, Brand A would be charged with 40 per cent. and Brand B with 60 per cent. of the general overhead for the month; or, if the over-

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head expense was \$100, the rate per pound, in the above instance, would be 10 cents.

(i) *Apportionment of General Overhead on the Basis of Time.* Where time is used as the unit of measure, the apportionment of the general overhead is sometimes made on the basis of productive hours of each department or machine group. For example, if the total productive hours for the month amounted to 3,000, of which Department A expended 2,000, and Department B 1,000, the former would be charged with $66\frac{2}{3}$ per cent. of the overhead, and Department B with $33\frac{1}{3}$ per cent. But this must be done either on the basis of man hours or machine hours throughout, and not on both.

(j) *Apportionment of General Overhead on the Basis of Labor and Material Value.* In some cases, general overhead may be apportioned on the basis of labor for that portion which is applied to the production cost, and on the basis of labor and value of material for that portion which is applied to the Supplementary Cost. In this, General Factory Expense would be apportioned on the basis of labor, while General Office Expense Account would be apportioned on the basis of labor plus the value of the material.

There are other methods of apportionment, but the ones above mentioned are those which are most commonly used and are about as accurate as any.*

There are at times some items of expenditures which are really a specific charge to some product, but the trouble or expense of securing the information often causes them to be treated as general overhead. Common sense must govern the action to be taken. A gain in one direction is sometimes a loss in another and the so-called "First," or "Direct Cost" is far less important than a minute analytical cost of the various contributing expenses.

*For a thorough discussion of this subject see "Expense Burden," by A. Hamilton Church.

64. Rates of Cost May Be Averaged. In Specific Job Cost there are no cost rates, but in Departmental or Process Cost, where a rate of cost is found and applied to all work passing through any department or group, or to any brand or product, the rate of cost should be averaged and thereby made continuous. For this, see Section 178, Form 18. By reference to this form it will be seen that the actual cost rates for the month (before any averaging has taken place) are also determined.

65. Inefficiency as It Affects Cost Rates. The cost system is the efficiency thermometer of the business only when an approximate current standard of maximum effectiveness has once been established.

Equality in rates of cost should not, on their face, be accepted as an indication of effectiveness. For instance, assume that two factories have identical departments, the same rates of pay and the same amount of overhead, and that four jobs are awarded to one and four identical jobs are awarded to the other; also, that the cost rates will be per hour.

At the end of the month, the department doing the work in Factory A, say, has expended 3,000 hours of productive time and finished the four jobs; Factory B has also expended 3,000 productive hours, but has only completed three of the jobs.

The rate of cost shown for each factory would be uniform, but the actual cost of operations would not be equal for both factories.

Efficiency in operations must be judged not only by rates of cost, but by a comparison of rates and output with previous rates and output. Where time is used as the unit of measure, the output should be reckoned by the hour or on the basis of speed performed by a man or machine in executing a job. This may sometimes be done automatically.

Where any measure of the product is used as the unit, the efficiency of the factory is much more easily determined, as the output permits of comparison.

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66. Expenses Which Cover a Period Exceeding the Current Month. These expenses are generally insurance premiums, water rents, depreciation, interest paid on notes discounted and on loans. When cash payment is made for such items, the payment may cover a period of from one to a number of months. On the other hand, such charges may be accumulating and, instead of being paid in advance, may be paid only after they are fully earned.

In either case, provision must be made to charge out each month to the cost work the proper proportion for the month's work.

A payment of interest made in advance (discount) on the 20th of the month, for one month, would have 11 days in one and 20 days in the subsequent month's work.

For depreciation, one-twelfth of the annual amount decided upon is charged to the month's cost work.

Where a factory is operated only four or five months out of the year, the expenses of the entire year should be estimated and apportioned over the operating period. Such cases are not often found, and the best that can be done is to base the estimates on past experience.

Pay Roll Account must be charged with only the actual wages paid to, or earned by the men during the current month. If the pay roll ran from the 28th of January to the 2nd of February inclusive, the exact wages for the four days in January should be charged to that month's cost work. The exact wages for the two days in February belong to the February cost work. This necessitates splitting the pay roll.

67. Depreciation.* The subject of adequate yearly provision for depreciation is a most important one and is here, through necessity, given in only a superficial manner. The

*For a detailed discussion on this subject see "Engineering Valuation of Public Utilities and Factories," by Horatio A. Foster. Acknowledgment is herewith made to this work for the preparation of this section. See also "Principles of Depreciation," by Earl A. Saliers, and "Depreciation of Factories," by Ewing Matheson.

manufacturer and the accountant, or in fact any two people, will usually disagree upon this subject, as there are so many elements and views which enter into its determination.

Whether a machine, or whatever it may be, should be looked upon, as to its value, from the viewpoint of a forced sale or its value to a "going concern" is one point of the discussion; or, whether the estimated life of the machine will not prove useless as a basis for depreciation, due to obsolescence. As a rule, the cost accountant is not qualified or engaged to judge of these questions. They are usually problems for a mechanical engineer, or, at least, for one whose experience in such matters has been wide.

It is of prime importance that the capital invested in property should be kept intact. To do this, it is necessary to approximate the years of economic usefulness of the property under consideration and to consider the causes which may lead to the abandonment or sale of the property, and its residual worth at that time. The amount of depreciation is always:

Original Cost plus repairs and renewals, less scrap or disposal value.

The cost of repairs and renewals is taken care of as it occurs by an immediate charge to earnings, but the ability to repair property plays an important part in establishing the life of it.

Depreciation may be the result of:

- (1) Physical impairment (the result of wear and tear on the property—deterioration).
- (2) Economic Improvement (causing obsolescence of the property).
- (3) Accident (caused by explosion, wreck, wind, etc.).

Protection against the last of these is usually a matter of forethought and insurance, but the first two items are matters of deep consideration, and the vast bearing which economic improvement plays in the matter of the life of property is most important.

To provide for depreciation, it is necessary to "set up" a reserve to which is credited each month the proper propor-

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tion. The Property Account should not be credited with these amounts.

In order to determine the amount of depreciation to be provided, there must be taken into consideration:

- (4) The ordinary life of the object.
- (5) The effect of possible economic improvement.
- (6) The effect of possible inadequateness.
- (7) The original cost.
- (8) The residual value.
- (9) The rate of interest which can be obtained upon annual installments to the depreciation fund.
- (10) Age and condition of the property under consideration.

Depreciation provision determined by using the above factors as a basis becomes as scientific as it is possible to make it, but at best it is only a guess.

The use of a sinking fund drawing interest is not always used, the reserve set up out of earnings being used as working capital and on which no account is taken of interest.

There are many methods of providing for depreciation, the most common of which are given below:

(a) *Depreciation based on Running Hours.* The estimated number of operating hours supposed to be contained in the life, divided into the original cost, will give the capitalized rate per hour of the machine. The number of operating hours expended by the machine each month multiplied by this rate will give the depreciation provision for each month. The rate is constant, unless some adjustment is found necessary. For example:

Original cost	= \$100
Life of machine (operating hours)	= 2500
Current month operating hours	= 200

$$\frac{\$100}{2500} \times 200 = \$8.00 \text{ depreciation for the month.}$$

(b) *Depreciation Based on Revaluation.* A revaluation is sometimes made the basis for the amount of depreciation to charge off. This method may be applied to machinery or other forms of property. If made annually, the amount of the revaluation deducted from the book value gives the yearly depreciation, and the reserve should be corrected accordingly.

Or, where a sinking fund is in operation and it is desired to check the physical condition of the property with the "condition per cent." of the fund, it may be necessary, on account of more rapid depreciation than anticipated, to make an adjustment in the fund.

(c) *Depreciation Based on Equal Annual Reductions.* An equal annual reduction from cost to zero, extending over the estimated life of the property, is also made the basis. This is known as the "straight line method." Or there may be an equal annual reduction from cost to an estimated residual scrap value, extended over the estimated life of the property. For example:

Original cost, \$1000.00.

Life of property, 2 years.

Depreciation 1st year, \$400, leaving \$600.

Depreciation 2nd year, \$400, leaving \$200 residual value.

(d) *Depreciation Based on Unequal Annual Reductions or Diminishing Values.* (See tables, pp. 52 and 53.) In this, an unequal annual reduction is made from cost to an estimated residual scrap value or zero, extended over the life of the property. The rate of depreciation is constant, but is calculated on the diminished values each year. The depreciation provided each year becomes less. As the repairs during the first years are slight and become greater during the later years, this helps to equalize the annual charge against the property. For example:

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O = Original cost = \$1000
V = Residual value = \$ 250
n = number of years = 5
x = rate per cent of depreciation = Unknown quantity

$$V = O (1 - x)^n$$

or

$$\$250 = \$1000 (1 - x)^5$$

$$(1 - x)^5 = \frac{1}{4}$$
$$\log (1 - x) = \frac{1}{5} \log .25$$

By the use of logarithms, it will be found that:

$$1 - x = .75787$$
$$x = .24213$$

For the first year the depreciation would be \$242.13; for the second year, $\$757.87 \times .24213 = \183.50 , etc.

The book entry for this depreciation each month is:

Depreciation Account
To Reserve for Depreciation Account
for one-twelfth of the annual charge.

(e) *Depreciation Based on Output.* An arbitrary rate per pound, etc., on the total output of manufactured goods may also be used.

(f) *Sinking Fund Provision for Depreciation.* Depreciation is sometimes provided for by means of a sinking fund at interest. The difference between the original cost and the estimated residual value, if any, is the amount of the sinking fund to be provided. This method is mostly used for the purpose of accumulating a sum of money which will retire, at maturity, an issue of bonds.

To find the annual installment necessary to produce, at 5 per cent. compound interest, the sum of \$1,000 in five years:

ILLUSTRATION.

r	= rate of interest	= .05
n	= number of years	= 5
S	= amount of sinking fund	= \$1000
$(1 + r)^n$	= compound interest	= \$1.27628156
I	= annual installment	= unknown

$$I = \frac{r}{(1+r)^n - 1} \times S$$

and substituting figures as above:

$$I = \frac{.05}{\$1.27628156 - 1} \times \$1000 = \$180.97$$

The book entry each month for this annual charge of \$180.97 is:

Depreciation Account
To Reserve for Depreciation Account
for one-twelfth of the annual charge.

and, as the money is invested so as to draw interest:

Sinking Fund Account
To Cash Account

for amount of depreciation reserve invested at 5%.

As the interest on the sinking fund investments is received:

Cash Account
To Reserve for Depreciation Account
for interest received on the sinking fund.

As this interest is invested, make entry as shown above.

(g) *Present and Investment Worths and Annuities.* The illustrations given here may all be worked from the Compound Interest Tables on pages 54 and 55:

Table I—DEPRECIATION ON DIMINISHING VALUES* (For formula, see section 63-d)

Years	1%	1 1/4 %	1 1/2 %	2 %	2 1/2 %	3 %	4 %
	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
0	1,000,000	.987,500	.985,000	.980,000	.975,000	.970,000	.960,000
1	.990,000	.975,156	.970,225	.960,400	.950,625	.940,900	.921,600
2	.980,100	.962,967	.955,671	.941,192	.926,859	.912,673	.884,736
3	.970,299	.950,930	.941,336	.922,368	.903,698	.885,292	.849,346
4	.960,596	.939,048	.927,216	.903,921	.881,089	.868,734	.815,872
5	.950,980	.927,305	.913,308	.885,843	.859,068	.832,972	.782,757
6	.941,480	.915,714	.899,608	.868,126	.837,591	.807,982	.751,477
7	.932,066	.904,267	.886,114	.850,763	.816,652	.783,743	.721,389
8	.922,745	.892,964	.872,822	.833,748	.796,235	.760,231	.692,534
9	.913,517	.881,802	.859,730	.817,073	.776,329	.737,424	.664,892
10	.904,382	.870,779	.846,824	.800,732	.756,921	.715,301	.638,239
11	.895,338	.859,895	.834,131	.784,717	.737,998	.693,842	.612,709
12	.886,385	.849,146	.821,619	.769,023	.719,548	.673,026	.588,201
13	.877,522	.838,532	.809,295	.753,643	.701,559	.652,836	.564,673
14	.868,746	.828,050	.957,155	.738,570	.684,020	.633,250	.542,086
15	.860,059	.817,699	.785,198	.723,798	.666,920	.614,253	.520,402
16	.851,458	.807,478	.773,420	.709,323	.650,247	.595,825	.499,586
17	.842,943	.797,385	.761,819	.695,136	.633,991	.577,950	.479,603
18	.834,514	.787,417	.750,391	.681,233	.618,141	.560,612	.460,419
19	.826,169	.777,574	.739,135	.687,609	.602,572	.543,784	.442,002
20	.817,907	.767,855	.728,048	.654,257	.587,620	.527,300	.424,322
21	.809,728	.758,257	.717,128	.641,171	.572,930	.511,655	.407,349
22	.801,631	.748,778	.706,371	.628,348	.558,606	.496,306	.391,055
23	.793,615	.739,419	.695,775	.615,781	.544,641	.481,416	.375,413
24	.785,678	.730,176	.685,398	.608,466	.531,025	.466,974	.360,396
25	.777,822	.721,049	.675,058	.591,396	.517,749	.452,965	.345,980
26	.770,043	.712,036	.664,932	.579,568	.504,806	.439,376	.332,141
27	.762,343	.703,135	.654,958	.567,977	.492,185	.426,194	.318,855
28	.754,720	.694,346	.645,134	.556,618	.479,881	.413,408	.306,101
29	.747,172	.685,667	.635,457	.545,485	.467,884	.401,006	.293,857
30	.739,701						

*The figures in this table were taken from "Engineering Valuation," p. 172, by Horatio A. Foster.

(For formula, see section 63-d) **Table II—DEPRECIATION ON DIMINISHING VALUES***

Years	5%	6%	7½%	10%	12½%	15%	20%
0	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
1	.950,000	.940,000	.925,000	.900,000	.875,000	.850,000	.800,000
2	.902,500	.883,600	.855,626	.810,000	.765,625	.722,500	.640,000
3	.857,375	.830,584	.791,453	.729,000	.669,922	.614,125	.512,000
4	.814,506	.780,749	.732,094	.656,100	.586,182	.522,006	.409,600
5	.773,781	.733,804	.677,187	.600,490	.512,909	.443,705	.327,680
6	.735,092	.689,870	.626,398	.531,441	.448,796	.377,149	.262,144
7	.698,337	.648,478	.579,418	.478,297	.392,696	.320,577	.209,715
8	.663,420	.609,569	.535,962	.430,467	.343,609	.272,490	.167,772
9	.630,249	.572,995	.495,764	.387,420	.300,658	.231,617	.134,218
10	.598,737	.538,616	.458,582	.348,678	.263,076	.196,874	.107,372
11	.568,800	.506,299	.424,188	.313,811	.230,191	.167,343	.085,899
12	.540,360	.475,921	.392,374	.282,429	.201,418	.142,232	.068,720
13	.513,342	.447,366	.362,946	.254,186	.176,240	.120,905	.054,976
14	.487,675	.420,524	.335,725	.228,768	.154,210	.102,770	.043,981
15	.463,291	.395,292	.310,548	.205,891	.134,934	.087,364	.035,184
16	.440,127	.371,575	.287,255	.185,302	.118,067	.074,251	.028,148
17	.418,200	.349,281	.265,711	.166,772	.103,309	.063,113	.022,518
18	.397,214	.328,324	.245,782	.150,095	.090,395	.053,646	.018,014
19	.377,354	.308,624	.227,349	.135,085	.079,096	.045,599	.014,412
20	.358,486	.290,107	.210,297	.121,577	.069,209	.038,760	.011,529
21	.340,562	.272,701	.194,525	.109,419	.060,558	.032,946	.009,223
22	.323,533	.256,358	.179,936	.098,477	.052,988	.028,004	.007,379
23	.307,357	.240,958	.166,441	.088,629	.046,365	.023,803	.005,903
24	.291,989	.226,501	.153,957	.079,766	.040,569	.020,233	.004,722
25	.277,390	.212,911	.142,411	.071,780	.035,498	.017,198	.003,778
26	.263,520	.200,136	.131,730	.064,611	.031,061	.014,618	.003,022
27	.250,344	.188,128	.121,850	.058,150	.027,178	.012,425	.002,418
28	.237,827	.176,840	.112,711	.052,335	.023,781	.010,562	.001,934
29	.225,935	.166,230	.104,258	.047,101	.020,808	.008,977	.001,547
30	.214,639	.156,256	.096,439	.042,391	.018,207	.007,631	.001,238

*The figures in this table were taken from "Engineering Valuation," p. 174, by Horatio A. Foster.

Table III*-COMPOUND INTEREST*

Years	Formula $(1+r)^n$						
	1%	1 1/4 %	1 1/2 %	1 3/4 %	2 %	2 1/2 %	3 %
1	1.01	1.0125	1.0115	1.01175	1.02	1.025	1.03
2	1.0201	1.025156625	1.030225	1.03530625	1.0404	1.050625	1.0609
3	1.030301	1.03797070	1.04567838	1.05342411	1.061208	1.07689063	1.092727
4	1.04060401	1.05094534	1.06196355	1.07185903	1.08243216	1.10381289	1.12550981
5	1.05101005	1.06408215	1.07728400	1.089061656	1.10408080	1.13140821	1.15927407
6	1.06152015	1.07738318	1.09344326	1.10970235	1.12616242	1.15969342	1.19406220
7	1.07213535	1.09085047	1.10984491	1.12912215	1.14868567	1.18868575	1.22987387
8	1.08285671	1.1048610	1.12649259	1.1488178	1.17165938	1.21840290	1.26677008
9	1.09368527	1.11829218	1.14338998	1.16898721	1.19509257	1.24886297	1.30477318
10	1.10462213	1.13297083	1.16054083	1.18944449	1.21899442	1.28008454	1.34391638
11	1.11566835	1.14642422	1.17794894	1.21025977	1.24337431	1.31208666	1.38423387
12	1.12682503	1.16076452	1.19561817	1.23143931	1.26824179	1.34488882	1.42576089
13	1.13809328	1.17526395	1.21355244	1.25298950	1.29360663	1.37851104	1.46853371
14	1.14947421	1.18995475	1.23175573	1.27491682	1.31947876	1.41297382	1.51258972
15	1.16096896	1.204982918	1.25023207	1.28727786	1.34586834	1.44829817	1.55798742
16	1.17257864	1.21988955	1.26898555	1.3192935	1.37278571	1.48450562	1.60470644
17	1.18430443	1.23513817	1.28802033	1.34302811	1.40024142	1.52161826	1.65284763
18	1.19614749	1.25057739	1.30734064	1.36653111	1.42824625	1.55965872	1.70243306
19	1.20810895	1.26620961	1.32695075	1.39044540	1.45681117	1.59865019	1.75350605
20	1.22019004	1.28203723	1.34685501	1.41477820	1.48594740	1.638861644	1.80811123
21	1.23239194	1.29806270	1.36705783	1.43953681	1.51566634	1.67958185	1.86029457
22	1.24471586	1.31428848	1.38756370	1.46472871	1.54597967	1.72157140	1.91610341
23	1.25716302	1.33071709	1.40837715	1.49036146	1.57689926	1.76461068	1.97358651
24	1.26973465	1.34735105	1.42950281	1.51644279	1.60843725	1.80872595	2.03279411
25	1.28243200	1.36419284	1.45084535	1.54298054	1.64080589	1.85384410	2.08377793

*The figures in this table were taken from "Engineering Valuation," p. 177, by Horatio A. Foster.

Table IV*-COMPOUND INTEREST*

Years	Formula: $(1+r)^n$					
	3½%	4%	4½%	5%	5¼%	6%
1	1.035	1.04	1.045	1.05	1.055	1.06
2	1.071225	1.0816	1.092025	1.1025	1.113025	1.1236
3	1.10871798	1.124864	1.14116613	1.157625	1.17424138	1.191016
4	1.14752300	1.16985856	1.19251860	1.21550625	1.23882465	1.26247696
5	1.18768681	1.21665290	1.24618194	1.27628156	1.30886001	1.33822558
6	1.22925533	1.26531902	1.30226012	1.34009564	1.37884281	1.41851911
7	1.27227926	1.31593178	1.36086183	1.40710042	1.45467916	1.50363026
8	1.31680904	1.36856905	1.42210061	1.47745544	1.53468651	1.59384807
9	1.36289735	1.42331181	1.48609514	1.55132822	1.61909427	1.68947896
10	1.41059876	1.48024428	1.55298942	1.62889463	1.70814446	1.7904770
11	1.45996972	1.53945406	1.62285305	1.71033936	1.80209240	1.89829856
12	1.51106866	1.60103222	1.69588143	1.79585633	1.90120749	2.01219647
13	1.56395606	1.66507351	1.77219610	1.88564914	2.00577390	2.13292826
14	1.61869452	1.73167645	1.85194492	1.97993160	2.11609146	2.26090396
15	1.67534883	1.80094351	1.93528242	2.07892818	2.23247649	2.39655819
16	1.73398604	1.87298125	2.02237015	2.18287459	2.35526270	2.54035168
17	1.79467555	1.94790050	2.11337681	2.29201832	2.48480215	2.69277279
18	1.85748920	2.02581652	2.20847877	2.40661923	2.62146627	2.85433915
19	1.92250132	2.10684918	2.30786031	2.52695020	2.76584691	3.02559950
20	1.98978886	2.19112314	2.41117102	2.60529771	2.91775749	3.20713547
21	2.05943147	2.27876807	2.52024116	2.78596259	3.07823415	3.39956360
22	2.13151158	2.36991879	2.63365201	2.92526072	3.24753703	3.60353742
23	2.20611448	2.46471554	2.75216635	3.07152376	3.42615157	3.81974966
24	2.28332849	2.56330416	2.87601383	3.22209994	3.61458990	4.04893464
25	2.36324498	2.66583633	3.00543446	3.38635494	3.813399235	4.29187072

*The figures in this table were taken from "Engineering Valuation," p. 181, by Horatio A. Foster.

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(1) To find the present worth of \$1 at compound interest for any number of years:

$$\begin{array}{lll} Pw & = \text{present worth} & = \text{unknown} \\ r & = \text{rate of interest} & = .05 \\ n & = \text{number of years} & = 5 \\ (1+r)^n & = \text{compound interest} & = \$1.27628156 \end{array}$$

$$Pw = \frac{1}{(1+r)^n}$$

substituting figures:

$$Pw = \frac{1}{\$1.27628156} = .7835$$

The present worth of \$1,000 discounted at 5 per cent. compound interest for five years would be:

$$\$1000 \times .7835 = \$783.50$$

(2) To find the present worth of an annual investment of \$1 at compound interest for any period of years:

$$\begin{array}{lll} Pw & = \text{present worth} & = \text{unknown} \\ r & = \text{rate of interest} & = .05 \\ n & = \text{number of years} & = 5 \\ (1+r)^n & = \text{compound interest} & = \$1.27628156 \end{array}$$

$$Pw = \frac{1}{\frac{1 - (1+r)^n}{r}}$$

substituting values:

$$Pw = \frac{\frac{1}{.05}}{\frac{1 - .7835}{.05}} = \frac{1}{.2165} = \$4.63$$

To provide an annuity of \$200 for a term of five years by making one installment, interest on this to be compounded at 5 per cent.:

$$\$4.33 \times \$200 = \$866.00 \text{ amount required}$$

(3) Depreciation may also be provided for by the Annuity Method. This provides for an annual charge to earnings of a sum which will write down the original cost or book value to the desired residual value or zero, plus a per cent. per annum on the investment value:

O	= original cost or book value	= \$1000
r	= rate of interest	= .05
n	= number of years	= 5
$(1 + r)^n$	= compound interest	= \$1.27628156
A	= Annual charge to earnings	= unknown

$$A = O (1 + r)^n \frac{r}{(1 + r)^n - 1}$$

Substituting values:

$$A = \$1000 \times \$1.27628156 \frac{.05}{\$1.27628156 - 1} = \$230.97$$

If the property thus depreciated was being written down to zero, the following entry would be made:

Depreciation Account.....	200 00
Interest on Plant Account.....	30 97
To Reserve for Depreciation Account.....	200 00
Interest Account.....	30 97

If the property was only being written down to a residual value, an additional entry should be made for the interest on the residual value:

Interest on Plant Account
To Interest Account

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(4) To find the amount that an annual investment of \$1 at compound interest will equal in any number of years:

$$\begin{array}{lll} s & = \text{final amount} & = \text{unknown} \\ r & = \text{rate of interest} & = .05 \\ n & = \text{number of years} & = 5 \\ (1+r)^n & = \text{compound interest} & = \$1.27628156 \end{array}$$

$$s = \frac{(1+r)^n - 1}{r}$$

substituting values:

$$\frac{\$1.27628156 - 1}{.05} = \$5.525631$$

\$200 invested annually at 5 per cent. compound interest for five years will amount to:

$$\$200 \times \$5.525631 = \$1105.18$$

(h) *Condition Per Cent.* It is assumed that a machine costing \$1,000 has a life of ten years and that it is desired, after five years to determine the "condition per cent," the sinking fund drawing say 5 per cent.:

$$\begin{array}{lll} C & = \text{condition per cent} & = \text{unknown} \\ r & = \text{rate of interest} & = .05 \\ n & = \text{term of years} & = 5 \\ l & = \text{life in years} & = 10 \\ (1+r)^n & = \text{compound interest} & = \$1.27628156 \end{array}$$

$$C = 100 - \left[\frac{(1+r)^n - 1}{(1+r)^l - 1} \right]$$

substituting values:

$$C = 100 - \left[\frac{\$1.27628156 - 1}{\$1.62889463 - 1} \right] = 56\%$$

In this, the sinking fund has provided for 56 per cent. of the depreciation. If, upon physical examination, a revaluation showed the actual depreciation to have been greater, an adjustment in the sinking fund would be necessary.

68. Statistical Accounts. Where the overhead is first transferred to Overhead on Work in Process Account or to Overhead on Finished Material Account, the financial overhead accounts are closed and become merely statistical. Or where the balance of an account is afterwards distributed to other accounts the same effect is produced.

The value of the statistical accounts lies in an easy reference as to the total expenditure under any classification for any period. An analysis of Overhead on Work in Process Account may always be obtained from the cost analysis sheet. (See Section 153, Form 2.)

69. Closing the Voucher Record. It is important, before closing the voucher record for the month, that all bills or vouchers covering expenditures affecting cost are entered.

70. Discrepancies in the Inventories. Discrepancies in the inventories are unavoidable, and especially where the stock taking is dependent for long periods on the perpetual inventory. These discrepancies may be either "short" or "over." If a shortage exists in the stock, it is usually either the result of pilfering or the improper recording of receipts or disbursements. The cost value of such a shortage should be charged to the remaining stock of the same class, if any, if possible, or may be charged to the current month's work. If the discrepancy chances to be the other way, reverse the procedure. Records of quantities should also be corrected.

71. Variations in Weights of Material Under Process. The quantity of material received from process may be considerably less than the quantity put into process, due to physical or chemical changes. The cost per pound (assuming pounds) of the finished material should be ascertained upon the basis

of pounds output and the cost value of the raw material put into process. During several processes, one process may show a loss while another shows a gain in weight. (See Section 169, Form 9.)

Labor on material, when figured on the basis of quantity, is treated in the same manner, except that the labor rate (per pound, say) for the labor on material in process is adjusted for each process where the variation is established. (See Section 171, Form 11.)

72. Transfers of Material in Process and Finished Material. Material in process or finished material may be transferred from one branch to another, in order to meet certain emergencies. Credit for quantity and cost of material, labor on material, bags or packing materials used in shipping, and freight should be given the proper accounts for the transfer, and, if it is desired to do so, overhead may also be charged.

It is usual to charge for these items at "cost." This cost is estimated as closely as possible. The exact rates at which this "cost" should be charged could not be ascertained until the cost work was completed. The factory receiving the transfer could not wait for the factory shipping it to make up its cost papers before beginning on its own. Therefore, the estimate is made, using the previous month's rates as the basis.

Overhead is not always charged on these transfers, for the reason that the ordinary overhead of the factory receiving the transfer would not be materially decreased, nor would the factory transferring the material show any material increase in overhead by reason of having partly prepared this material. Where these transfers become regular or frequent, overhead should be charged.

73. Returned Goods. Where manufactured goods are returned and are in a condition for resale, the quantity and cost value are deducted from the quantity and cost of sales for the

month. In doing this, the cost value is based on the cost as originally applied to the returned goods.

74. Loss and Damage. This item should be taken up in the cost work whether it occurs to the raw material or to the manufactured goods, provided it is not compensated by insurance salvage or claim; in which case, only the difference between the cost and the value received should be charged to the cost work.

A loss in material, raw or finished, might be adjusted by establishing a correct or revised rate of cost per pound, etc., and by retaining the value (including the value of the lost or damaged material) and adjusting the quantity. These items may also be treated as general overhead.

Defective work may also be treated similarly to the above.

75. Revenue as It Relates to Cost Work. Revenue derived from the sale of scraps, if practicable, could be credited to the cost of finished material received out of process. Where the amounts involved are comparatively small, they are usually ignored in the cost work.

Where repairs are made to the machinery or buildings, revenue derived from any displaced parts should be credited to Repairs and Renewals Account. The net charge to the account for the month is then used in the cost work.

76. The Difference Between Departmental Cost and Process Cost. The difference between these methods of cost finding lies chiefly in the fact that for the former a rate of cost is obtained for each classified operation (department), which rates apply to all work passing through the respective departments or machine groups. Departmental cost is applied where there is an absence of uniform reproduction in the articles manufactured and is less efficient when applied to the manufacture of a variety of standard articles.

In Process Cost, the rate of cost is found for each product separately. The departmental method may enter into this in

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ascertaining the labor charge against material in process, if the processes are practically the same for each product. In this case, one labor rate might be applied to all products. But where the processes are very different from one another, or where the cost of one process is in excess of that used for another product, the labor rate of cost for each process must be ascertained for each product.

Departmental rates of cost do not include material cost. Process Cost rates do.

77. Overtime. If overtime is paid for at, say, "time and one-half at the regular rate," only the actual working time would be counted as productive time. The total wages paid, however, are charged against direct labor. The total time paid for should appear upon the pay roll.

On the cost sheets, the wages paid for overtime may be entered, if desired, under a separate classification and may be charged specifically to the jobs.

78. Wages and Productive Time. Where time is used as the unit of measure, the labor rate of cost is based, as to time on the actual productive hours only, and, as to value on both the wages paid for productive hours and the wages paid for unproductive hours.

On the other hand, the labor rate of cost per hour may be determined on the basis of productive hours and productive wages only.

The former method is the simplest and is most used. The unproductive time should always be tabulated and compared with previous months.

Where a literal "direct" cost was sought, a separation would have to be made.

CHAPTER III.

SPECIFIC JOB COST.

79. General Remarks. In the absence of conditions permitting departmental organization, in order that departmental rates of cost per hour (man or machine) may be established upon which to compute all jobs, the only recourse is to find the cost of each job separately.

Each order undertaken is given a job number, and all items of expense affecting the cost of each job are charged to the job to which they relate. In this type of cost finding, a cost journal and cost ledger are necessary. An account is opened in the cost ledger for each job, and a column each is allotted, on the debit side of the account, to raw material used, direct labor and overhead expense.

The usual plan of elaborate interlocking of the financial accounts with the cost ledger accounts entails more labor than the simple plan of arranging the cost ledger accounts so that a check as to balances may be obtained from certain of the accounts contained in the general ledger. For this reason, the latter plan has been adopted, and this permits of the complete set of cost accounts being kept in the general ledger. As the trial balance for the cost accounts will be separate and distinct from the trial balance of the financial accounts, there is no need of closing the books until the end of the fiscal year.

80. Raw Material Received. Where stocks of material are kept on hand, the cost should be as per invoice without deduction for cash discount allowed. Stock books should contain suitable ruling for quantity, price and value. An account should be opened for each class or style of material, and receipts should be debited through the stock department journal, a credit being made to Raw Material Stock Account. The

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credit balance of this latter account (in the stock record) should represent the aggregate of the debit balances of the different raw material accounts.

In the general ledger, the controlling account for the stock ledger would be the Raw Material Stock Account.

STYLE No. 10 A/C

Dr.	lbs.	at	value		Cr.
Jan. 1	1,000	.15	150 00		
Jan. 15	10,000	.17	1,700 00		

WRAPPING MATERIAL, 10 OZ.

Dr.	pcs.	at	value		Cr.
Jan. 15	2,000	.002	4 00		

RAW MATERIAL STOCK ACCOUNT.
(Stock Ledger Controlling Account)

Dr.					Jan. 1	Mdse.	Cr.
					Jan. 15	"	150 00 1,704 00

81. Raw Material Disbursed. Material should be disbursed under proper requisition in duplicate; one to be retained by the stock department and the other to be returned to the cost department. The stock clerk should complete the requisitions by entering the price and value of the stock disbursed. Each requisition should bear the number of the job to which it relates. Purchases of the same material may be made at different times and at different prices. As material may be disbursed daily, and as the cost must be entered on the requisitions, averaging the cost becomes impossible, except at the end of the month when bringing down the balances of the accounts. The greatest care possible should be exercised in fixing the cost of material disbursed. The value and quantity of material disbursed are entered to the credit of the account in the stock ledger and are charged to the raw material stock account. For material disbursed, the entry in the general books would be:

Raw Material on Work in Process a/c
To Raw Material Stock a/c

In the cost books an entry would be made:

Job 1 a/c

Job 2 a/c

To Raw Material or Work in Process a/c

82. Compiling the Cost Data Relating to Material Disbursed.

A material abstract or summary is necessary in order to avoid the labor of making entries from each requisition through the cost journal for posting to the cost ledger accounts. On this summary, each column is headed with a specific job number and the requisitions for the month are entered on this summary as they come in. One column should be reserved in which to enter the total value of the material summarized. The total value of material used on each job is entered, at the end of the month, through the cost journal, as shown in the preceding section, and postings are made to the respective cost ledger job accounts. The footing of the total column on the abstract should be checked with the footings of the job columns and with the record of the stock clerk of material disbursed by him. The material abstract of the cost department would be about as follows:

COST DEPARTMENT
Material Abstract,—January, 1915

Req. No.	Total Value	Job No. 50	Job No. 51	Job No. 52	Job No. 53	Job No. 54
25	25 00		25 00			
26	15 00					15 00
27	30 00				30 00	
28	2 00			2 00		
29	10 00	10 00				
	82 00	10 00	25 00	2 00	30 00	15 00

The stock clerk would then have to make up a recapitulation of his requisitions, in order that the time and trouble of posting each one separately to the stock ledger accounts may be saved. This recapitulation would be according to quantity, class and style and value. The totals of quantity and value

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would be posted to the credit of the respective stock accounts. This recapitulation would be as follows (quantities are here omitted) :

STOCK DEPARTMENT
Material Abstract,—January, 1915

Req. No.	Total Value	Stock No. 1	Stock No. 5	Stock No. 6	Stock No. 8	Stock No. 15
25	25 00	10 00	15 00			
26	15 00			15 00		
27	30 00	5 00		1 00		
28	2 00				2 50	1 00
29	10 00				10 00	22 50
	82 00	15 00	16 00	15 00	13 50	22 50

83. Direct Labor. Each man employed on jobs is provided with a time ticket on which must be entered the date, pay roll number, job number under which he may work (and identification), and the time devoted to each job. The wages earned must also be shown on these tickets.

A labor analysis must then be prepared from these tickets. Each column on this abstract or analysis should be allotted a job number. Two columns should be reserved, in one of which should be entered the miscellaneous labor wages, and in the other the total of all entries shown under the job columns. For example:

LABOR ABSTRACT,—JANUARY, 1915

Date	Miscell. Wages	Productive Wages	Job No. 50	Job No. 51	Job No. 52	Job No. 53
1	3 50	12 00	2 50	4 00	3 50	2 00
2	2 00	8 00	4 00		3 00	1 00
etc.	Each line	represents	the total	wages paid	for that	day.
	5 50	20 00	6 50	4 00	6 50	3 00
	Assuming 60% of direct wages to be the correct amount of overhead to be applied to each job.—See below and section 84—					
			3 90	2 40	3 90	1 80

Of course, a recapitulation of the daily tickets should be made and the total for that day entered on the proper line of the abstract.

The pay rolls are entered through the voucher record as follows:

Pay Roll a/c
To Accounts Payable a/c

The distribution of the pay roll should then be made. The distribution data are obtained partly from the labor analysis above described and partly from the pay roll book or sheets (for those items which do not appear upon the labor analysis). Entry should then be made through the general journal or voucher record as follows:

Labor on Work in Process a/c
Miscellaneous Labor " "
General Office Expense " "

To Pay Roll a/c

The Pay Roll Account then becomes statistical. A record of time, except for the pay roll and for statistical purposes, is not necessary in this type of cost finding.

Before making an entry in the cost journal for the labor, the overhead may be applied to each job directly on the labor abstract, as shown above. This is usually done on the basis of direct labor, and the percentage is obtained as shown in Section 63. Entry is then made from the labor abstract or analysis, through the cost journal, as follows:

	Direct	
	Labor	Overhead
Job No. 50.....	6 50	3 90
Job No. 51.....	4 00	2 40
Job No. 52.....	6 50	3 90
Job No. 53.....	3 00	1 80
To Labor on Work in Process a/c.....	20 00	
Overhead on Work in Process a/c.....		12 00

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The jobs completed during the month should then be ascertained and the totals of the respective debit columns on these accounts should be recapitulated and an entry made through the cost journal:

Raw Material on Work in Process a/c
Labor on Work in Process " "
Overhead on Work in Process " "
To Job No. 50 a/c
Job No. 51 a/c
etc.

The above entry would balance the job accounts, showing the items to have been charged out to manufactured goods. In Section 85, the entry is given which affects finished or manufactured goods. After all entries for the month have been made to it, the credit balance of Labor on Work in Process Account, in the cost ledger, will represent only the labor value expended on work still in process at that time, and will check with the debit balance of a similar account in the general ledger.

84. Overhead or Indirect Expense. For methods of applying the overhead see Section 63.

The debit balances of the overhead accounts in the general ledger, after all entries affecting these have been made for the month, are transferred by journal entry in the general journal, in form as follows:

Overhead on Work in Process a/c
To General Factory Expense a/c
Repairs and Renewals "
Miscellaneous Labor "
Power "
Taxes, Rent and Insurance "
Depreciation "
Shipping Room Expense "
General Office Expense "
Administration "
Selling Expense "

The entry in the cost journal for the overhead was shown in the preceding section. The classified overhead accounts in the general ledger become, after the above entry has been made, statistical.

It is then necessary to transfer the overhead used on finished work into the cost accounts, and this will be shown in the following section:

85. Finished or Manufactured Work or Goods. After all entries described in the preceding sections have been made, then, from the recapitulation of finished jobs, as explained in Section 83, make entry in the general journal, in form as follows:

Material Used a/c

Labor Used "

Overhead Used "

To Raw Material on Work in Process a/c

Labor on Work in Process "

Overhead on Work in Process "

This entry charges the cost accounts, in the general ledger, with the values used on the work completed during the month. An entry is also made:

Manufactured Goods a/c

material

labor

overhead

To Manufacturing a/c

For the cost of goods manufactured during the month.

The former is a financial (asset) account, the latter the controlling account for the cost accounts. This entry effectually separates the financial from the cost accounts.

In the cost journal a similar entry to this latter is made, simply in order to place this information in the book.

From the accounts of the jobs billed during the month,

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an entry is made in both the general and cost journals for the cost (not selling value) of these sales:

Cost of sales a/c
To Manufactured Goods a/c

and in the general journal only:

Accounts Receivable a/c
To Sales a/c
As per sales book.

86. Closing of the Accounts. At the end of the fiscal year, the cost accounts in the general ledger are all closed into Manufacturing Account, which will then balance.

Cost of Sales Account is closed into Sales Account, and the balance of this latter is transferred to Loss and Gain Account.

In the cost ledger, the closing of the job accounts was explained in Section 83. The remaining accounts in the cost ledger are treated as follows:

At the end of the fiscal year, an entry is made in the cost journal:

Manufacturing a/c
To Cost of Sales a/c

The credit balance, if any, of the former account will then correspond with the debit balance, if any, of Manufactured Goods Account. The balance of this latter account will correspond with the debit balance of Manufactured Goods Account in the general ledger, representing the manufactured work or goods on hand. The remaining open accounts in the cost ledger would be:

Raw Material on Work in Process Account
Labor on Work in Process Account
Overhead on Work in Process Account
Various Job Accounts (in process).

The total of the credit balances of the three first named accounts should agree with the total of the debit balances of the various job accounts (still in process).

87. Material Returned to Stock. If material is returned to stock, the entry for the financial accounting would be:

Raw Material Stock a/c
To Raw Material on Work in Process a/c

and for the cost accounts, through the cost journal:

Raw Material on Work in Process a/c
To Job No. 1 a/c

88. Transfers of Material. Material should not be transferred from one job to another except by recorded methods. If a transfer is made directly from one job to another, the only entry made is one through the cost journal:

Job No. 1 a/c
To Job No. 2 a/c
For the value of material transferred from the latter to the former.

This transfer would not be noted on the material abstract at the end of the month.

89. Summary. In the foregoing, the function of the cost ledger is limited, as far as the book keeping goes, to ascertaining the cost of each job, and this is all that the cost ledger is needed for.

The cost analysis is limited to the cost of material, labor and overhead, no further analysis of the overhead as applied to each job being ascertained. If this was attempted, the ordinary cost ledger page would be inadequate and the volume of work necessitated would not be compensated by the results obtained. The classified cost accounts in the general ledger will show the values under each classification which have been used on manufactured goods.

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If it is desired to have the cost ledger job accounts show the profit on each job, this may be done by providing a space at the top of each job account in which the estimated or selling price of the job may be placed. The cost ledger should be loose leaf; several volumes may be used, some containing only work in process, the others containing only the completed job accounts.

Where a large order occurs against which goods are shipped and billed before the completion of the entire order, an extra sheet should be used in the ledger of finished work, and to this could be transferred, from the job account (contained in the ledger of work in process), the cost of the finished portions of the job as billed.

CHAPTER IV.

DEPARTMENTAL COST.

INCLUDING SPECIFIC JOB COST.

(*The Man Hour As the Unit of Measure.*)

90. General Remarks. Departmental Cost is based on the hour of productive time—man or machine, or both. In this chapter, only the man hour will be considered.

The cost journal and ledger are not necessary here, as in Specific Job Cost, for the reason that the cost is ascertained on the basis of departmental rates, which apply equally to all jobs passing through the respective departments.

In the absence of uniform reproduction, all work must be identified by a job number.

The cost accounts are all contained in the general ledger. The cost analyses should be taken up on printed forms, and the figures on these must always agree with the controlling accounts in the general ledger. The accounts are so arranged that, before all of the cost entries for the month have been made a preliminary trial balance would have to contain the balances of both the financial accounts and the cost accounts, but after these have been made and posted there will be an effectual separation between the two sets of accounts.

91. Raw Material Received. The raw material received is recorded, from the invoice, in the stock records according to class, style, quantity, price and amount. The entry for this, through the voucher record, is:

Raw Material Stock a/c

To Accounts Payable a/c

Discount " (for the discount, if any).

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The stock clerk must charge, in his entry, each classified material account and credit Raw Material Stock Account for the materials received, both as to quantity and cost. A day book or stock journal should be used and postings made from this to the stock ledger. Cash discounts allowed on the invoices should be ignored by the stock clerk. This does not refer to trade discounts.

92. Raw Material Disbursed. Disbursements of material should be made under requisition in duplicate, each bearing a number, and giving information as to the job number (and identification) for which the material was issued, class and style of material, quantity, price and value.

A recapitulation is made of these requisitions by the stock clerk under each class and style disbursed, and the values and quantities are placed in their respective columns. From the totals of this recapitulation, an entry is made through the stock journal:

Raw Material Stock a/c
To Stock No. 1 a/c (quantity and value)
Stock No. 2 a/c (quantity and value)
etc.

or the postings could be made directly from the material abstract or summary.

The duplicates of the requisitions returned to the cost department form the basis for a recapitulation of material disbursements as to value only. These requisitions are posted to the job summary form, as shown in Section 94. A daily recapitulation is also made of these requisitions and recorded. At the end of the month, this will furnish a check upon the accuracy of the postings made to the job summary forms and will also check the accuracy of the stock clerk's recapitulation. The requisitions may then be filed according to number.

For the total material disbursed during the month, an entry is made in the general journal:

Raw Material on Work in Process a/c
To Raw Material Stock a/c

The value of the material put into work or process is transferred to the proper place on Form 1, Section 152.

At the end of the month, the material columns of the job summary forms covering completed work are recapitulated (see Section 94) and the amount is entered on the record of completed work (see Form 4, Section 155). For the value of the material used, an entry is made:

Raw Material Used a/c
To Raw Material on Work in Process a/c
For the cost of material used, as per record of completed work,
on manufactured goods.

As the completed or manufactured goods are billed, the job data are transferred from the record of completed work to the sales book and are entered in the columns provided for the analysis of cost of sales. (See Form 5, Section 156.)

93. Time. In ascertaining departmental labor rates of cost, a strict account is kept of productive time. The wages paid for both productive and unproductive (not miscellaneous labor) time of the operators are not usually separated.

The productive time (hours and tenths of hours) of each department divided respectively into the total wages paid the operators of each department, establishes the labor rate of cost per hour per department for the month.

For ascertaining time, time clocks are conveniently placed throughout the factory. These clocks are controlled by one central clock.

Each operator is provided with a time ticket, a different

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color, or some other distinguishing method, being used for each department. These tickets should provide for information as to the date, job number, identification of job (in case of error in entering job number), pay roll number of man, character of work performed and the time devoted to it. The ticket, with the day's entries, would be about as follows:

TIME TICKET

James Brown, Operator Department "A"					Pay Roll No. 5 January 22, 1915 Time 9.0 hours
Time	Job No.	Pro- duc- tive Time	Unpro- duc- tive Time	Customer	Character of Work
5. P. M.	20	.5		John Jones	
4.5			.5	Cleaning up	
4.	12	3.5		John Smith	
12.5			.5	Lunch	
12.			.5	Cleaning up	
11.5	54	1.5		Black & Company	
10.	50	2.		White & Co.	
8. A. M.				Starting time.	
Totals		7.5	1.5		

The minutes are expressed in tenths of hours, as the clocks register the time in this manner, and this affords a very easy decimal to handle. The two columns representing productive and unproductive time are completed in the office. This time is known as the "elapsed time." Entries to be made by the workmen should be reduced to a minimum. Where a workman is transferred from one department to another, he should adopt the ticket of the department to which he is transferred.

The total time of each man is entered on the pay roll op-

posite his number and name and in the proper "day" column, the pay roll book showing the department to which the time applies. Where a man has worked in two or more departments, an adjustment must be made, since his name should appear but once upon the pay roll. The pay roll can easily be made to take care of this by divisions providing for debit and credit adjustments between the departments. The tickets, after they are entered on the pay roll, are turned over to the cost department.

The productive time (only) of all the time tickets should then be recapitulated according to departments and a record should be kept of the total daily productive time of each department, in order that, at the end of the month, a check may be had upon the accuracy of the postings to the job summary forms, as explained in Section 94.

A recapitulation should also be made of the unproductive time, and this should be compared with the unproductive time of other months.

94. Labor. After the labor time tickets are received from the pay roll clerk, the cost clerk should recapitulate the productive time (only) of all the tickets, as explained in the preceding section.

The productive time on these tickets is then posted to the job summary forms, an illustration of which is shown below. A form is allotted to each job number and is about as follows:

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JOB SUMMARY FORM

JOB No. 80

James Brown, New York City

SUMMARY OF PRODUCTIVE TIME AND COST VALUE OF MATERIAL

Date	Dep't "A"	Dep't "B"	Dep't "C"	Dep't "D"	Dep't "E"	Material	Merchandise
							See section No. 148
Totals							

On this form, the minutes should be shown in tenths of hours. At the end of the month, the columns are footed and the totals are entered in small figures in red ink. For those jobs which are finished, the forms are closed off and the footings placed on the total line. Where a job has not been completed during the month, the same form should be used until completion of the job. The total productive time for the current month is obtained from the recapitulation of the time tickets, as described in the beginning of this section.

The pay roll is entered each week through the voucher record:

Pay Roll a/c
To Accounts Payable a/c

For the distribution of the pay roll, it is necessary to refer to the recapitulation figures of the pay roll book or sheet, as to the money, and to the recapitulation of the time tickets, as above described, in order to obtain the productive time of each department. From the figures thus obtained, an entry is made:

Dep't A, Labor on Work in Process a/c	hrs.....\$
Dep't B, Labor on Work in Process a/c	hrs.....\$
Dep't A, Expense (miscellaneous labor)	a/c....\$
Dep't B, Expense (miscellaneous labor)	a/c....\$
General Factory Expense (miscellaneous labor)	a/c....\$
General Office Expense (salaries, etc.)	a/c....\$
Administration (executives)	a/c....\$
To Pay Roll a/c.....\$	

The net charges for the month of both time and money to the department labor accounts are transferred to their respective places on Form 2, Section 153. The entry above described should be made at the end of the month, and for the total pay rolls for the month. The labor accounts must contain two debit and two credit columns. One column each for time, and one each for money.

It is then necessary to ascertain the time and labor value which should be charged out to completed work. The job summary forms covering work completed during the month are entered, as to time and material value, in the record of completed work (Form 4, Section 155), each job being allotted a line. The columns of this record are then footed and these footings will represent the total time of each department used on the work completed during the month. On the respective ledger labor in process accounts, the debit balance of hours and tenths of hours divided into the debit balance of money will give the respective rates per hour to be applied for the month to the used time. These rates are then applied to the

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time used on completed work, as shown in Section 153, Form 2. Taking the figures from this latter form, an entry is made:

Dep't A, Labor Used a/c	hrs.....	\$
Dep't B, Labor Used a/c	hrs.....	\$
To Dep't A, Labor on Wk in Process a/c	hrs...	\$
Dep't B, Labor on Wk in Process a/c	hrs...	\$
For time and labor value used in each department on goods completed during the month.		

95. Overhead or Indirect Expense. From the general ledger classified expense accounts (excluding the Department Expense Accounts), the respective balances are entered in a total column on a sheet providing for the apportionment of these items. A column is allotted to each department. For the method of apportionment to be used, see Section 63. Entry is made for the transfer of these balances of overhead as follows:

Overhead on Work in Process a/c
To General Factory Expense a/c
Department A, Expense "
Department B, Expense "
General Office Expense "
Selling Expense "
Administration "

An entry like this is made each month in order to concentrate the balances of the classified expense accounts into one account. The proper portion of this overhead is then applied to finished work, and that portion which is applicable to work still in process at the end of the month is retained in the Overhead on Work in Process Account. From the apportionment sheet (see Form 3, Section 154) the apportioned overhead charges to each department, as per expense classification, are entered on a form like Form 2, Section 153. Having ascertained on this form the proportion chargeable to finished work, an entry is made in form as follows:

General Factory Expense Used a/c

Department A, Expense Used " "

Department B, Expense Used " "

General Office Expense Used " "

Selling Expense Used " "

Administration Used " "

To Overhead on Work in Process a/c

This entry places among the cost accounts the value of the indirect expenses applied to the manufactured (completed) work, and leaves among the financial accounts, as an asset, the value of the indirect expense applying to work still in process.

96. Value of Work Remaining in Process. In order to check the accuracy of the postings to the job summary forms (Section 94), one recapitulation must be made, at the end of the month, of the job summary forms covering work completed during the month, and another recapitulation must be made of those covering work still in process at the end of the month. The totals of these should then be compared with the daily record of the recapitulated time tickets and the material requisitions. For example, taking only the monthly totals:

RECORD OF DAILY RECAPITULATIONS.

	Dept. A Time	Dept. B Time	Material Value
Inventory at 1st of month.....	1000 (hrs)	500 (hrs)	\$ 800 00
Total time for the month as per daily recapitulations.....	3000	1500	
Total value of material put into work, as per material daily recap- pitulations			1200 00
Less time and material value, as per job summary forms covering work completed during the month	4000	2000	\$2000 00
	3200	1200	1400 00
Inventory at end of month..... (In Process)	800	800	\$ 600 00

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The inventory at the end of the month, as shown above, should agree with the recapitulated figures of the job summary forms covering work in process at the end of the month. It should also agree with the inventory shown on Form 2, Section 153.

97. Finished Work. Information as to completed work should go to the cost clerk promptly and the job forms covering the finished work should be entered in the record of completed work and then go to the billing clerk. At the end of the month, the cost data regarding all jobs completed during the month are obtained from the totals of the columns of the record of completed work. (See Form 4, Section 155.) Or, if all jobs are billed directly upon completion, the data may be obtained from the sales book cost analysis. (See Form 5, Section 156.) The information as to time furnishes the basis for transferring the cost of labor from Labor on Work in Process Account to Labor Used Account.

A recapitulation of the value of material used forms the basis for the transfer of material value from Raw Material on Work in Process to Raw Material Used Account.

An entry is then made to establish a controlling account for the various used or cost accounts, and to establish among the financial accounts, as an asset, an account to which is charged the cost of work completed during the month:

MANUFACTURED GOODS A/C.....	\$
Raw Material Used	
Dept. A Expense Used	
Dept. B Expense Used	
Genl. Office Expense Used	
Genl. Facy. Expense Used	
Administration Exp. Used	
Selling Expense Used	
TO MANUFACTURING A/C.....	\$

From the data obtained from the sales book entries for

the month (Form 5, Section 156), the following entries are made:

Cost of Sales a/c
 To Manufactured Goods a/c
For the cost of sales for the month.

and:

Accounts Receivable a/c
 To Sales a/c
For the sales value of goods sold for the month.

98. Closing the Accounts. In closing the books at the end of the fiscal year, the balances of all the cost or used accounts are transferred to Manufacturing Account. The latter account will then balance.

The balance of Cost of Sales Account is transferred to Sales Account; the balance of Sales Account to Loss and Gain Account, and the balance of this latter is transferred to Surplus Account.

99. Summary. By consulting the "Illustration of Departmental Cost," beginning with Section 146, a much more definite idea may be obtained as to the accounting and the analyses. Also, as to how the cost of specific jobs is ascertained, which is fully shown in sections 155 and 156.

The necessity for closing the overhead accounts is due to having to apply the entire overhead for the month first over goods in process, and then having to charge the cost accounts, representing values used, with the proper proportion applicable to finished work. Lastly, reference as to overhead expense must be left in such form that the total of any one classification for any given period may be quickly ascertained.

The cost of the unit of production, in this type, cannot be relatively expressed by either one or several units alone, as the cost of the material used on the work does not enter into the cost rates. Therefore, the cost rates for each job must be separately expressed according to departments.

CHAPTER V.

DEPARTMENTAL COST.

INCLUDING SPECIFIC JOB COST.

(Machine and Man Hours As the Units of Measure.)

100. General Remarks. As explained in Section 55, the machine operating hour may be adopted as the unit of measure for a department (machine group) where the manufacturing process is performed by machines. Some of the machines, by reason of size, capacity, etc., may require more labor than other machines in the same group, but the idea is to ascertain the cost per operating or running hour for each group. The plan may also be applied to individual machines. The rates obtained will include all cost charges except the cost of the material used. While the machine hour may be used for one or more departments, in other departments of the same factory the man hour may be used as the unit of measure. The subject will, therefore, be treated in conjunction with the man hour.

For the sake of clearness, certain common expense accounts are cited and the relation of these to the cost accounting is explained as a guide to the principles involved and as to form.

Cost, based on the machine operating hour, apportions the overhead more accurately to the work than when based on the man hour. Estimates for work are also more easily made. Automatic registration of output should be provided for, if possible, since speed is one of the factors by which the efficiency of the factory must be reckoned.

Instead of keeping a ledger account for each job, a job cost form may be used. This form should provide a "cost col-

umn" and a "sales column." The former should contain the itemized figures pertaining to the cost, according to departmental and machine group classification; the sales column should contain the figures pertaining to the selling price or estimate made to, and accepted by the customer. The latter information may be filled in at once, and should be itemized to correspond with the information to be contained in the cost column. This form should not be confused with the job summary form described in Section 94.

101. The Accounts. In this section a few of the most common expense accounts will be treated as to how they affect the departmental man hour or the machine operating hour method. It will be assumed that there are two machine groups for which the machine hour cost is ascertained, and one department in which the cost per man hour is found.

(a) *Machine Group No. 1, Labor on Work in Process Account.* This account is charged with productive and unproductive wages paid for operating the particular machine group, and with the productive machine operating hours. Two columns should be provided on each side of the account, one column on each side for time, and one each for money.

(b) *Machine Group No. 1, Expense Account.* To this account should be charged only such expenses as apply specifically to the machine group, as, for instance, supper money, miscellaneous labor and like items. At the end of the month there will be other charges to this account from the journal for supplies used, depreciation, rent, insurance, repairs, etc., directly affecting and apportioned to this group.

(c) *Department A, Labor on Work in Process Account.* This account should provide debit and credit columns for both time and money. To it are charged only the productive man (not machine) hours, but both the productive and unproductive wages paid.

(d) *Department A, Expense Account.* To this account are charged, directly through the voucher record, expenditures

made specifically for the department. Through the journal, at the end of the month, there will be other charges.

(e) *Repairs and Renewals Account.* These items should be entered through the voucher record by charging the total voucher to the account and crediting Accounts Payable Account, and then, in the same entry or by journal entry, distributing the amounts to the proper accounts, crediting Repairs and Renewals Account for the distribution. This has the effect of concentrating the total expenditures under this classification into a statistical account which can be easily referred to. The general repairs and renewals, not applicable to any department or group, should be charged to General Factory Expense Account.

(f) *Power, Taxes, Insurance, Depreciation and Rent Account.* These items may be contained in separate accounts.

Charges for power would consist of expenses for running the power-house, or for current furnished, and are distributed through the journal, at the end of the month, to the various machine groups or departments on the basis of actual power used or horsepower hours. (See Section 63.)

Taxes are charged monthly from a prepared schedule, credit being given to Provision for Taxes Account. The distribution is made by crediting Taxes Account at the end of the month for the net charge and charging General Factory Expense Account.

Insurance premiums are charged as paid to the Unexpired Insurance Account. The monthly proportion is credited to this account and charged to Insurance Account. The net charge to this latter account is then distributed through the journal to the various machine group and department expense accounts, according to the insured value as to machinery; that portion which is general is charged to General Factory Expense Account, Insurance Account being credited for the distribution.

Depreciation provision for the month is entered through

the journal and charged to Depreciation Account, Reserve for Depreciation Account being credited. The distribution of the charge to the former account is made according to prepared schedules, over the machine group and department expense accounts, for that portion which specifically affects them. The balance, which is general, such as depreciation on buildings, etc., is distributed to General Factory Expense Account. Depreciation Account is credited for the distribution.

Rent is charged to Rent Account monthly. Distribution is made on the basis of floor space and charged proportionately to the machine group and department expense accounts. That portion of the rent which is general is charged to General Factory Expense and General Office Expense Accounts proportionately.

After the entries for the distribution of the balances have been made, the account or accounts containing the above items will balance.

(g) *General Factory Expense Account.* This account is charged with such items as miscellaneous wages, shipping room expenses, teams, porters, miscellaneous expenditures and with that portion of repairs and renewals, rent, depreciation, etc., which does not specifically affect some machine group, department, or General Office Expense Account.

After all charges for the month have been made to this account, it is necessary to determine the portion applicable to each machine group or department. This may be done on a properly prepared analysis form (Form 3, Section 154) and the apportioned amounts are then entered in their respective places on a form similar to Form 2, Section 153. The closing of this account renders it of statistical value only, as shown in Section 108.

(h) *General Office Expense Account.* To this account are charged the general office expenses, salaries of clerks, etc. The monthly apportionment of the balance of this account is made (see Form 3, Section 154) and the apportioned amounts are

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placed in their respective column, lines and divisions on the cost analysis (Form 2, Section 153). The closing of this account, by which it becomes statistical, is shown in Section 108.

(i) *Administration Account.* Salaries of officers, executives, etc., are charged to this account. The apportionment of the balance, at the end of the month, over the machine groups and departments is made and the figures used as above described. The closing of this account is shown in Section 108.

(j) *Selling Expense Account.* To this account are charged the traveling expenses, salaries and commissions of salesmen and advertising. The monthly balance is apportioned and applied, and the account is closed as indicated in the preceding sections. The apportioned items are transferred to their proper places on the cost analysis. (See Form 2, Section 153.)

102. Raw Material Received. Receipts are charged to Raw Material Stock Account, Accounts Payable and Discount Accounts being credited for the amount of the invoice through the voucher record. The stock records should be kept as shown in Section 91.

103. Raw Material Disbursed. The cost data must show the value of the material put into process from stock for the month, and the cost value of all material used from start to completion on work finished during the month. Besides this, the material used must be charged against each job specifically. This information must be obtained through a careful recording of each disbursement of material. To this end, material is issued only upon presentation of a properly signed requisition. The requisition must bear a number and contain information as to the date, job number, class and style of material, quantity, cost price and value. The originals are retained by the stock clerk and the duplicates are returned to the cost department to be posted daily to the job summary forms, as described in Section 94. The requisitions are recapitulated daily by the cost clerk and a perpetual record is kept (as shown in

Section 96) so that, at the end of the month, the total value of the material put into and remaining in process may be quickly arrived at. The total value of the material put into process for the month must agree with the recapitulation of the stock clerk of material disbursed by him.

The stock clerk's recapitulation is made up on the basis of quantity, class and style, and value.

The cost department daily recapitulation record of the requisitions serves as the basis for the following entry, to be made at the end of the month:

Raw Material on Work in Process a/c

To Raw Material Stock a/c

For the value of raw material put into process during the month.

The stock clerk must enter through the stock journal, or directly from his recapitulation, to the credit of each stock account, the quantities and cost values of materials disbursed, and Raw Material Stock Account should be charged with the aggregate of all such entries. The credit balance of the latter account in the stock ledger must agree with the debit balance of Raw Material Stock Account in the general ledger. The requisitions are filed according to number.

As work is completed, the information contained on the job summary forms is entered on the record of completed work, Form 4, Section 155. As the jobs are billed, the data, pertaining to them, are transferred from this form to the cost analysis portion of the sales book.

The total of the material column of the record of completed work (Form 4, Section 155) furnishes the basis for the entry:

Raw Material Used a/c

To Raw Material on Work in Process a/c

The record of completed work also furnishes the data necessary to complete the job cost form described in Section 100. On Form 4, Section 155, the calculations for the time

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cannot be made until the end of the month, after the rates of cost for each department and machine group have been established on Form 2, Section 153. The job cost form, when completed, may be filed for future reference.

104. Time Tickets of the Men. In the departments where the cost of the man hour is sought, the tickets of the men are in form and are treated in the same manner as described in Section 93.

Where the machine operating hour cost is sought, the time tickets of the men need only show the starting and stopping time, in order that the total time made by them for the day may be ascertained. The tickets must show the department in, or machine group on which the men were employed. The entries to the pay roll are made from these tickets. A different color of ticket should be used for each department and group, if possible.

105. Machine Group Time Tickets. These tickets should state plainly the machine group, job number and identification, character of the work, output and running time (productive) and the idle time of the machine. The identity of the machine is usually established by the signature of the chief operator on the ticket. Where a job is completed, and the elapsed time between that and the starting of a new job has been devoted to cleaning up, or has simply been idle time, the elapsed time should be so noted. A different color of machine ticket should be used for each group if possible. The productive time shown on the tickets of each group may form the basis for the depreciation of the machines, as explained in Section 67.

The machine tickets are never used as the basis for entries to the pay roll, but the operator of each machine must stamp, in a space provided on each ticket, the starting and stopping time of each operation, as shown in Section 93.

The machine time tickets should go to the cost clerk, in order that the elapsed time may be entered on the tickets in

the columns provided for this. These columns would be headed "Productive Time" and "Idle Time." A recapitulation should be made daily by the cost clerk of the running time of each group and a perpetual record should be kept. At the end of the month, the total productive hours for the month may be easily ascertained from such a record. The running time on these tickets is then posted to the various job summary forms affected. After this, the tickets may be filed, but, as each ticket may contain items concerning more than one job, it is necessary to file these according to departments and date.

106. The Pay Roll. This form or book should provide columns for the numbers of the men, their names, the total hours made each working day, the total time for the week, rates of pay and the wages earned by each man. The name of a man should appear but once. In order to provide for adjustments necessary to be made on account of the shifting of men from one department or group to another, the pay roll should contain adjustment divisions for each department and group.

When the pay roll is completed, the total of each department or group division will show the distribution. The entry through the voucher record would be:

Pay Roll a/c
To Accounts Payable a/c

If a separation of productive and unproductive wages was desired, it would be necessary to arrange the pay roll book to provide for this, as also the various recapitulation forms.

107. Labor. In Section 106 the entry for the pay roll was shown. The next entry to be made is for the distribution of the pay roll.

From the pay roll book or sheet, the amount of wages paid for each department and group, for miscellaneous labor, and salaries for the general office are ascertained. The productive time is obtained from the record of the daily recapitulations of the man tickets for the departments, and of the machine

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tickets for the machine groups, as described respectively in sections 93 and 105. At the end of the month, an entry is made for the distribution of the pay rolls as follows:

Machine Group 1, Labor on Work in Process a/c	hrs.	\$
Machine Group 2, Labor on Work in Process "	hrs.	\$
Department A, Labor on Work in Process "	hrs.	\$
General Factory Expense "		\$
General Office Expense "		\$
Machine Group 1, Expense "		\$
Machine Group 2, Expense "		\$
Department A, Expense "		\$
To Pay Roll a/c		\$

The time and money charged for the month to the machine group and department labor accounts are transferred to their respective columns and divisions on Form 2, Section 153, on line 2 of each.

It is then necessary to establish the total hours of each department and group used from the start to the completion of all jobs completed during the month. This information is obtained from the month's record of completed work, Form 4, Section 155. The time applying to each department or group is transferred to the time column and entered on the fourth line of each respective division on Form 2, Section 153, and multiplied by the rates established for the month, as shown on this form on the third line of each division in the rate column. This will give the value of the labor which should be charged out for the month to manufactured goods. Entry is then made:

Machine Group 1, Labor Used a/c	hrs.....	\$
Machine Group 2, Labor Used "	hrs.....	\$
Department A, Labor Used "	hrs.....	\$
To Machine Group 1, Labor on Work in Process a/c		\$
Machine Group 2, Labor on Work in Process "		\$
Department A, Labor on Work in Process "		\$

For time and value of labor used on work completed
during the month.

108. Overhead Expense. (See Section 101.) After all charges for the month have been made to the overhead accounts, the general overhead is apportioned over the work (machine groups or departments) by schedule (as to taxes, depreciation, insurance, rent, etc.) or, on the basis of direct labor. These accounts are then closed by entry as follows:

Machine Group 1, Expense a/c
Machine Group 2, Expense "
Department A, Expense "
General Factory Expense "
General Office Expense "
Administration "
Selling Expense "
To Repairs and Renewals a/c
Taxes, Deprec., Ins., Rent and Power a/c
For distribution of the debit balances of the latter accounts.

The debit balances of each machine group and department expense account, and the general overhead as apportioned to each group or department, are transferred to their respective lines, columns and divisions on Form 2, Section 153. In order to concentrate these balances in the ledger into one account, an entry is made:

Overhead on Work in Process a/c
To Machine Group 1, Expense a/c
Machine Group 2, Expense "
Department A, Expense "
General Factory Expense "
General Office Expense "
Administration "
Selling Expense "

109. Cost of Finished Work Ascertained. A form similar to that shown in Section 153, is used on which to apply the expense (exclusive of material) of each department and machine group to work finished during the month.

Vertical columns are provided for each classified expense, and separate horizontal divisions for each machine group and department.

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The first line of each division indicates the value of the inventory of work still in process on the first of the month, left over from the previous month.

The second line is for the items of cost for the current month.

The third line represents the total of the two foregoing items. By dividing the time on this line of each division into each classified expense amount on the same line, the respective cost rates per hour are obtained, which are applied to the hours and minutes on the fourth line of each division ("used on work completed during the month").

The fifth line indicates the inventory of work still in process at the end of the month.

A recapitulation division may be added to the form, if desired, and a column then added, in the recapitulation division only, for the value of the material used. However, this recapitulation division would not show cost rates, but merely values. The total labor and overhead values used on work finished during the month could then be ascertained from the fourth line of the recapitulation division. Entry, as shown in Section 107, would then be made:

Machine Group 1, Labor Used a/c	hrs.....\$
Machine Group 2, Labor Used "	hrs.....\$
Department A, Labor Used "	hrs.....\$
To Machine Group 1, Labor on Wk in Process	hrs. \$
Machine Group 2, Labor on Wk in Process	hrs. \$
Dep't A, Labor on Work in Process a/c	hrs. \$

and then :

Machine Group 1, Expense Used a/c
Machine Group 2, Expense Used "
Department A, Expense Used "
General Factory Expense Used "
General Office Expense Used "
Administration Used "
Selling Expense Used "
To Overhead on Work in Process a/c

The result of these entries is to charge the cost accounts with the total value of labor and overhead used on the work completed during the month.

For the value of the material used on the finished work, as shown in Section 97, an entry is made:

Raw Material Used a/c
To Raw Material on Work in Process a/c

The financial accounts (representing assets) of Raw Material on Work in Process Account, Labor on Work in Process Account and Overhead on Work in Process Account are all relieved of the values which have been put into the finished work, and now represent only values contained in the work which is still in process.

Then, to place among the financial accounts the value of the finished work, and to establish a controlling account for the various cost accounts (used accounts), make entry:

MANUFACTURED GOODS A/C.....	\$
Machine Group 1, Labor	
Machine Group 2, Labor	
Department A, Labor	
Machine Group 1, Expense	
Machine Group 2, Expense	
Department A, Expense	
General Factory Expense	
General Office Expense	
Administration	
Selling Expense	
Raw Material	
TO MANUFACTURING A/C.....	\$

Such an entry effectually separates the two sets of accounts. Form 2, Section 153 will provide full analytical information.

110. The Sales Book. The sales book can be so arranged as to avoid the necessity of having a cost ledger in which to keep the specific job accounts. It also serves as the basis for two

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important entries. By referring to Form 5, Section 156, the general plan can be seen. From the total of the cost column of the sales book, make entry:

Cost of Sales a/c
To Manufactured Goods a/c

This entry relieves the latter account of assets disposed of during the month, and charges the former account with them at cost.

Then, from the total of the sales column of the sales book, make entry:

Accounts Receivable a/c
To Sales a/c
For the sales value of the goods sold during the month.

The hours and minutes only, and the value of the material for each job are first entered in the cost analysis side of the sales book, a line being allotted to each job number. At the head of each machine group or department column are entered the respective hour rates of cost, as obtained from the various divisions on Form 2, Section 153. The calculations must then be made in order to ascertain the cost of each job. The job cost form, referred to in Section 100, may then be completed.

The information for the sales analysis is obtained from the job cost form, on which is found, in the sales column the itemized estimate quoted to and accepted by the customer. This information is entered accordingly in the sales analysis columns of the sales book.

The sales book will contain all the information necessary for preparing a statement of departmental profits, as well as a statement of profits on material and merchandise used.

111. Closing the Accounts. At the end of the fiscal year, the cost accounts are all closed into Manufacturing Account. The latter account will then balance. Cost of Sales Account

is closed into Sales Account, and the balance of this latter is then transferred to Loss and Gain Account.

The balance of Loss and Gain Account is closed into Surplus Account.

These represent, the entire closing entries and show at a glance how clear a picture of the operations can be obtained from the monthly trial balances of the financial accounts throughout the year, and how minute an analysis may be obtained from the various analysis forms. See trial balances, sections 159 and 160.

CHAPTER VI.

PROCESS COST—SIMPLE TYPE.

QUANTITY AS THE UNIT OF MEASURE.

112. General Remarks. In this chapter, the manufacture of products (brands, styles, etc.) will be considered. In this, the raw material is put into and subjected to process until it has reached the stage of "finished material" for each specific product, after which the only further operation needed to complete the manufacture is to pack the material into containers.

As the packages or containers may be of different sizes, the cost of labor (which for packing is usually paid on some piece rate plan which varies according to sizes) and wrapping material for each size used must be ascertained.

The cost of material used for each specific product is determined by the cost of the material put into process for each. In speaking of the specific products, they will hereafter be referred to as "Brands" for simplicity.

The cost of labor on material in process is analyzed, and the rate ascertained at which to charge out the labor on finished material (ready for packing). A proportion of this is afterwards charged, each month, to manufactured goods. The labor on material in process may be charged to all products at the same rate of cost per measure, or the labor rate of cost for each may be different.

If all of the material was put through the same machines and processes, the difference in the products being caused by a mixture of different qualities of materials and different flavoring, or some similar process, then the labor rate of cost per measure would be the same for all.

But where specific processes for the various products obtain, the labor rate of cost per measure per product would have to be specifically found.

Overhead for the current month is distributed to the various classified expense accounts. It is then charged out each month in its entirety to the goods manufactured (completed) during the month. Where the labor rate of cost for the labor on finished material of each product is the same, or nearly so, the overhead may be apportioned over the various brands on the basis of production of manufactured goods.

Where the rate of cost for labor on finished material of each product varies, the overhead should be apportioned over the manufactured goods on the basis of labor on finished material used on goods manufactured (completed) during the month.

From the various analysis and apportionment forms, as shown in sections 162 to 180, the items affecting manufactured goods are concentrated on a form like Form 18, Section 178, and the unit of cost is then found for each classified expense by dividing the total production of each class of goods manufactured during the month into the contributing classified expenses applied to each. The sum of these units of cost for any one brand, etc., will be the unit of cost per pound, per yard, etc., of the manufactured product.

An unusual quantity of raw material put into process during the last days of the month, and on which scarcely any work was performed during that month, would have the effect of holding back, over the material in process, more than the proper proportion of labor cost, and would temporarily, at least, decrease the labor rate of cost on finished material for that month. Time constitutes the most equitable method of charging out labor. But the trouble and expense of ascertaining how long each lot of material stayed in process would not be practicable.

113. Raw Material Received. The stock record should be

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kept by opening an account for each classified material and by charging each account with quantity and cost value. These accounts would include the wrapping materials (packages, paste, labels, twine, boxes, etc.). At the end of the month, the entry through the general books, from the voucher record, would be:

Raw Material Stock No. 1 a/c
Raw Material Stock No. 2 "
Wrapping Material "
To Accounts Payable a/c

114. Raw Material Disbursed. The recapitulation by the stock clerk at the end of the month would be made as to the quantity of each class of raw material disbursed, the average price to be applied and the value. These data should be checked with the cost department; the various stock accounts should then be credited for the withdrawals.

The cost department recapitulation must show the quantities of raw material, price and value put into each brand for the month. This information is then placed on a form similar to Form 8, Section 168 in order to ascertain the price to be applied to the quantities of raw material put into process for each brand. The value of the raw material in process is then worked out on Form 9, Section 169.

A separate recapitulation of the wrapping materials should be made as to quantities, price and value of each size (as to the packages and labels), and quantity price and value as to the paste, twine, etc. (For this, see Form 13, Section 173.)

For the total raw material put into process for the month, an entry is made:

Raw Material in Process a/c.....	\$
To Raw Material Stock No. 1 a/c lbs.....	\$
Raw Material Stock No. 2 " lbs.....	\$

115. Wrapping Material Analysis. For this, see Form 13, Section 173. The value of the wrapping material used in the packing of each brand is ascertained by this analysis and an entry is made:

Wrapping Material Used a/c
To Wrapping Material Stock a/c

The figures are then transferred from this analysis to Forms 15 and 16, Sections 175 and 176, and from these to Form 18, Section 178.

116. Finished Material. The quantity of finished material received out of process for the month for each brand (see Form 9, Section 169) must be ascertained and, if possible, by actual inventory, the quantity of raw material remaining in process at the end of the month.

From each brand division on Form 9, Section 169, the average price of the raw material for each brand is obtained. The total pounds of each brand on line 7 divided into the respective total cost values of the raw material of each brand will establish the rate at which the finished material should be charged out. An entry is made through the journal for the figures on the ninth line of the form:

Finished Material Stock a/c
To Raw Material in Process a/c
For the pounds and value of finished material received out of process for the month.

The pounds and value of the finished material are then transferred to Form 10, Section 170 and the figures are placed in their respective places. These are added to the figures on the form comprising the inventory of finished material at the first of the month and the total of pounds of each brand divided into the respective values of each, establishes the rate of cost at which the finished material packed (manufactured or completed goods) during the month for each brand should be charged. The pounds ascertained to have been used for

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the month are then placed in their respective places on the form and multiplied by the rates as above established to be applied to finished material used on manufactured goods. The form is then completed, and the pounds and money of each brand used on manufactured goods are transferred to their respective places on Form 18, Section 178.

An entry is made for the figures on the fourth line of each brand division on Form 10, Section 170, as follows:

Finished Material Used a/c
To Finished Material Stock a/c
For pounds and value of finished material used on goods manufactured during the month.

117. Labor. The pay roll is first charged to Pay Roll Account and is then distributed. In order to make the proper distribution, an analysis of the pay roll must be made. The labor on material chargeable to each process is determined and, if necessary, for each brand separately.

The labor chargeable to Labor Wrapping Account (putting into packages, labeling, etc.) must be ascertained.

Likewise, the labor chargeable to General Factory Expense Account and the salaries chargeable to General Office Expense Account must be distributed.

The pay roll analysis is used as the basis for the labor statement, Form 11, Section 171, and for the distribution of the pay roll in the following entry:

Labor on Raw Material in Process a/c
Labor Wrapping " "
General Factory Expense " "
General Office Expense " "
To Pay Roll a/c

118. Labor on Raw Material in Process. Form 11, Section 171 is used for the purpose of determining the rate at which to charge the labor on material received out of process, and to establish the rate of cost for labor on material remaining in process.

If the processes are different for the different brands, more divisions for brands should be added and, at the head of each, should be placed the name of the brand to which it refers. The processes should bear specific names, as "Mixing," "Grinding," "Cutting," "Drying," "Flavoring."

In the first process division are entered the items comprising the inventory of labor on material in process, and the quantity of the material.

On the next line, the pounds put into process and the labor charge for the month.

The figures on the first two lines are then totaled and the total of pounds is divided into the total of the money and this establishes, for each brand, the rate per pound at which to charge the labor on material to the next process.

Having ascertained the pounds delivered during the month to the next process, the weight is multiplied by the rate and the money inserted. The balance will represent the inventory of labor on, and the quantity of material remaining in process No. 1 at the end of the month.

The subsequent process divisions should begin with their respective inventories of pounds and money. On the next line are added pounds and labor value charged during the month from the preceding process. To the labor value is added the labor charged to the process during the month, but, of course, without any entry in the pounds column. A total is then made of the foregoing entries and the total of pounds is divided into the money. The rate thus obtained is the labor rate of cost at which to charge out the material delivered to the next process. The rate of cost for each process includes the rate of cost for each preceding process, if any.

The pounds of material received out of the final process are then determined and multiplied by the cumulative labor rate as established. The amount so found is the labor value to be charged out to Labor on Finished Material Account. Then, from the final process division of each brand on the labor

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statement, the item of "charged to labor on finished material" is made the basis for the entry:

Labor on Finished Material a/c

To Labor on Raw Material in Process a/c

For the value of labor on finished material received out of process during the month.

An analysis is made of the Labor on Finished Material Account, as shown on Form 12, Section 172. This forms the basis for an entry:

Labor on Finished Material Used a/c

To Labor on Finished Material a/c

For the value of labor on finished material used on manufactured goods for the month.

If the labor value thus established covered all brands, it would have to be apportioned as shown on Form 17, Section 177.

If the labor value used was specifically established for each brand on the labor statement, the transfer would be made directly from the labor statement to Form 18, Section 178.

119. Labor Packing, Labeling, etc. (Labor Wrapping). From the pay roll analysis, the pounds of material for which the wrapping is paid for the month, and the wages paid for the same, are inserted in the proper divisions of the labor statement, Form 11, Section 171.

The wrapped goods, at the end of the month, may have a few trays of packages left over which are not counted as manufactured goods, since they are not completely wrapped and are, therefore, not ready to be placed in stock or shipped.

Then insert on the form the pounds of goods wrapped (manufactured goods) during the month, multiply by the rate established on the form and the amount thus obtained is the amount of money to charge out in the following entry:

Labor Wrapping Used a/c

To Labor Wrapping a/c

For the value of labor wrapping used during the month.

120. Analysis of Labor Wrapping. A further analysis for labor wrapping for each brand is required.

Where the cost of wrapping for each size package or container is paid at different rates, an analysis of the cost of each size for each brand must be made (see Form 14, Section 174). As the wages paid will be based on some plan of piece rate, the analysis of labor wrapping is quite easily made and reconciled with the labor statement.

The figures from this analysis are transferred to Forms 15 and 16, Sections 175 and 176. Each brand is allotted a form on which an analysis is made of the wrapping material and labor wrapping used on each size package of manufactured goods. A summary is also made on each form for each brand and the recapitulated figures are transferred to their proper places on Form 18, Section 178.

121. Overhead Expense. See Form 17, Section 177. The distribution of the net debits for the month of each classified overhead expense account are made on this sheet. The balance of each account is placed on this form in the proper column on the line provided for the totals. The total of all pounds manufactured is divided into these amounts in order to obtain the rate per pound for each classified expense. The pounds of each brand are then multiplied by the rates thus established in order to secure the proper apportionment.

The cost of material for each brand may also be placed on this sheet from Form 10, Section 170. The pounds of each brand are divided into the respective material values to obtain the cost rates per pound of material. All figures on this form are then transferred to Form 18, Section 178, and placed in their respective places. No entry is made to close the overhead accounts, as they are all cost accounts; the entire overhead each month being charged out to manufactured goods.

122. Manufactured Goods and Cost of Sales. For the analysis of manufactured goods and cost of sales, Form 18, Sec-

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tion 178 is used, and the figures on this analysis form the basis for the entry:

MANUFACTURED GOODS A/C.....	\$
Raw material	
Labor on raw material.	
Labor wrapping	
Interest on plant	
General factory expense	
Wrapping material	
General office expense	
Administration	
Selling expense	
TO MANUFACTURING A/C.....	\$

This entry places among the financial accounts, as an asset, the cost of the manufactured goods and establishes, by the latter account, a controlling account for the cost accounts.

The next entry, also from this form, would be:

Cost of Sales a/c
 To Manufactured Goods a/c

Thus crediting the latter account for the goods sold or shipped
From the sales record, an entry would be made as follows:

Accounts Receivable a/c
 To Sales a/c

123. Closing the Accounts. At the end of the fiscal year, the cost accounts are all closed into Manufacturing Account, Cost of Sales Account into Sales Account, and the balance of Sales Account is then transferred to Loss and Gain Account.

124. Analysis of Profits. Form 19, Section 179, will show a full analysis of the cost rates per pound for each size of package for each brand. Likewise, the selling price and the profit made on each.

CHAPTER VII.

PROCESS COST—COMPLEX TYPE.

QUANTITY AS THE UNIT OF MEASURE.

125. General Remarks. It may be necessary for the raw material to undergo separate processes, from which it is received as "finished material" under specific product names. It may then be either sold under its specific classification, or mixed, assembled or joined in order to produce other specific products.

This necessitates a little change in the detail as compared with process cost of the simple type, where the finished material of each brand is simply packed under its specific product name.

In this type, the cost is sought first for each class, brand or style of finished material. These finished materials are then virtually held in stock awaiting final disposition.

The expense of material, labor, specific and general overhead work are charged to the various finished materials.

If the finished material is simply packed and sold under its specific product name, the labor wrapping would be the only additional charge.

If several of the finished materials were assembled, the additional charges would be labor assembling, assembling overhead, labor wrapping and wrapping material.

The processes which the raw material undergoes in the manufacture of the finished materials may require, at first, a temporary unit of measure. For instance, raw material might be put into process on the basis of pounds. After one or more processes it may take some shape which would permit of pieces being used as the unit of measure. In order to charge

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out the value of the raw material to finished material (received out of process), pounds must be used in the analysis of the raw material in process, but the number of pieces received out of process and the value of the same would be charged to Finished Material Account, instead of pounds and money. The unit of measure for the finished material must be made to conform to that which will be used for the manufactured product, if it is possible to do so.

126. Pay Roll Analysis. The pay roll analysis for the month should show the labor chargeable to each classified process, labor assembling, labor wrapping or packing (including the boxing), miscellaneous labor to be applied over all operations, and the salaries, etc., chargeable to General Office Expense Account. This analysis will form the basis for the distribution of the pay roll and for the compiling of the labor statement. (See Form 11, Section 171.)

127. Distribution of the Pay Roll. The pay roll is first charged to Pay Roll Account through the voucher record and, from the pay roll analysis, distributed to the various general accounts as follows:

Labor on Raw Material in Process a/c	
Labor Assembling	"
Labor Wrapping	"
General Factory Expense	"
General Office Expense	"
To Pay Roll a/c	

The above entry would account for the distribution and closing of the Pay Roll Account. Each of the accounts charged would be analyzed in order to apply the specific labor charges against the proper brands and processes, and in order to distribute the general labor charges over all operations.

128. Cost Analysis of Finished Material. Form AA, page 112, is used for the cost analysis of finished materials, since in this type of cost finding the overhead is first charged against the finished materials.

A division is allotted to each kind of finished material (distinguished by its product or trade name). The vertical columns are headed by the proper expense classification in order to obtain an analysis of the cost.

Column 1 should contain the quantities of finished materials. The quantity of finished material on each line divided into the money on the same line will establish the rate of cost, say, per piece for each contributing item of expense. The figures to be contained in this analysis are obtained as follows:

- (a) As to the material, from the analysis form of raw material in process. (See form 10, section 170).
- (b) As to flavoring, from the factory records of the value of flavoring disbursed and used.
- (c) As to the labor on material, from the analysis of labor on finished material. (See forms 12 and 17, sections 172 and 177).
- (d) As to the overhead, from the analysis of the overhead accounts. (See form 17, section 177).

The six lines of each division on Form AA, Sec. 128, above referred to, would represent the following:

- (e) Inventory of finished material on hand at the first of the month.
- (f) Finished material received during the month.
- (g) The total of the above two items.
- (h) Less the finished material packed or wrapped.
- (i) Less the Finished Material assembled or mixed.
- (j) Inventory of the Finished Material on hand at the end of the month.

The figures relating to the current month's work should be entered in their respective columns of each division of each brand on the second line. These figures are obtained from the analyses of raw material in process, the labor statement and from the several overhead accounts.

The figures on the fourth line of each division should represent the quantity and value of finished material of each

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brand, style or make packed or wrapped under its specific product name (and not assembled with other finished materials in order to produce other products.)

The figures on the fifth line of each division should represent the quantity and value of the finished materials delivered for assembling or mixing and which were actually used on goods manufactured (completed) during the month. From the figures in the total cost of manufacture column on the fifth line of each division as to values, and from the quantity column as to quantities, the quantities and values are transferred to Form CC, Sec. 129, and inserted in the proper places on the second line of each division.

Likewise, the figures on the fourth line of each division on Form AA, Sec. 128, in the total column should represent the values to be transferred to Form BB, Sec. 129. The quantities transferred are secured from the quantity column of Form AA. These should represent only the quantities actually completely wrapped.

The figures remaining on the last line of each division on Form AA, cost analysis of finished materials, should represent the analyzed cost of the various finished materials on hand at the end of the month awaiting disposition; either by being wrapped separately as to brands and being placed among the stock of manufactured goods, or by being transferred to the "assembling room" and being mingled or joined with other finished materials to produce other products, or both. This inventory may include quantities in the assembling room not yet completely assembled.

As the main effort of the business is usually directed to the manufacture and sale of the assembled products, the sale of finished parts being incidental, it is better to apply the overhead direct to the finished material in order that whatever disposition may be made of the same, its proportion of the overhead is the same.

129. Analyses of Manufactured Goods. Form BB, page 113,

and Form CC, page 114, will show respectively the cost analysis of manufactured goods and cost of sales of manufactured goods not assembled, and the cost of manufactured goods and cost of sales of manufactured goods assembled or mixed.

Form BB would be used for the finished materials completely wrapped under their own specific product names and made a part of the manufactured goods. The figures on this form should show the inventory at the beginning of the month. The figures for the second line of each division are secured from Form AA, fourth line of each division. By adding together the figures shown on the two lines above referred to and dividing the quantity thus obtained for each brand into the money on the same line, the rates of cost are established at which the sales should be charged for the month.

On the fourth line of each division, the quantity sold of each brand should be inserted in the quantity column, and these quantities multiplied by the rates, above referred to, will give the proportion of each classified expense to be charged against the cost of sales.

The fifth line of each division should represent the inventory of manufactured goods (not assembled or mixed) on hand unsold or unshipped at the end of the month.

Form CC, Sec. 129, is slightly different and is used for the manufactured goods analysis of those articles which are manufactured out of several finished materials.

The vertical columns are headed by the respective finished material names contained in each style or make of article, the labor assembling, the assembling expense, and the labor wrapping. The rate of cost for each classified expense of each finished material used may be obtained from Form AA. The average rate of cost at which to charge the cost of sales is obtained in the same manner as described above for Form BB. On Form CC, the vertical columns should provide for the number of pieces, etc., used of each finished material, since a number of pieces of one finished material may be used in the manufacture of one assembled article.

Form AA. COST ANALYSIS OF FINISHED MATERIAL. Month of

		1	2	3	4	5	6	7	8	9	10	11
	BRAND A	Quantity	Raw Material	Favoring	Labor on Raw Material	Repairs and Renewals	Depreciation, Taxes, Rent, Insurance, and Power	General Office Expense	Administration	Selling Expense	Total Cost	Rate
a	Pieces	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
b	Yards	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
c	Gallons	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
d	Pounds	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
e												
f												
g												
h												
i												
j												
k												
l												
m												
n												
o												
p												
q												
r												
s												
t												
u												
v												
w												
x												
BRAND B												
BRAND C												
BRAND D												

Form BB
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Form BB. Cost Analysis of Manufactured Goods (Net Assembled) and Cost of Sales.

	1	2	3	4	5	6	7	8	9	10	11	12	13
BRAND A	Quantity	Raw Material	Flavoring	Labor on Raw Material	Repairs	Depreciation, Taxes, Rent, Insurance and Power	General Factory Expenses	Labor Wrapping	Wrapping Material	General Office Expense	Selling Expense	Administrative Expenses	Total Cost
	Pieces	• \$	• \$	• \$	• \$	• \$	• \$	• \$	• \$	• \$	• \$	• \$	• \$
a	Inv. Mfd. Goods at 1st of Mo.												
b	Mfd. During Mo.												
c	Total												
d	Sales												
e	Inv. Mfd. Goods at end of Mo.												
	BRAND B												
f													
g													
h													
i													
j													
	BRAND C												
k													
l													
m													
n													
o													
	BRAND D												
p													
q													
r													
s													
t													

FORM BB

1915.

Form CC. Cost Analysis of Manufactured (Assembled) Goods and Cost of Sales. Month of

	1	2	3	4	5	6	7	8	9	10
TYPE "A-Z" (Brands A, C and D)	Assembled (or Mixed) Quantity	Brand A	Brand B	Brand C	Brand D	Labor Assam- bling	Labor Wrap- ping	Wrap- ping Material	Assem- bling Expense	Total Cost
	Pieces	Quantity Used	Quantity Used	Quantity Used	Quantity Used	Rate	Rate	Rate	Rate	Rate
a. Inv. Mid. Goods at 1st of Mo.										
b. Mid. During Mo.										
c. Total										
d. Sales										
e. Inv. at End of Mo.										
TYPE O (Brands C and D)										
f.										
g.										
h.										
i.										
j.										
TYPE L (Brands A, B and D)										
k.										
l.										
m.										
n.										
o.										
p.										
q.										
r.										
s.										
t.										

The rates of cost are obtained by dividing the quantities in column No. 1 into the values in the classified expense columns.

FORM CC

130. Raw Material Received. For this, see Section 113, which fully explains.

131. Raw Material Disbursed. For this, see Section 114. The recapitulation of material disbursed during the month should show the total quantity and value of the material put into process for each classified product for which the cost is to be found. This recapitulation forms the basis for the entry on the analysis form of raw material in process. See Forms 9 and 11, Sections 169 and 171. It also serves as the basis for the entry:

Raw Material in Process a/c
To Raw Material Stock a/c

The analysis of raw material in process (Form 9, Section 169) will give full details as to quantity and value of each class of material and for which specific products it was put into process. Also, the quantities and values of raw materials in process at the first of the month, as also the finished material of each brand delivered out of process during the month; also, information as to the raw material remaining in process at the end of the month.

132. Raw Material in Process and Finished Material. Where the unit of measure used for the material in process is the pound, say, while the unit of measure to be applied to the finished material is one piece, the process accounts should include both pounds and money, while the finished material accounts should be kept in pieces and money. The following entry is made, in such a case, for the material received out of process:

Finished Material a/c pieces.....\$
 To Raw Material in Process a/c lbs..... \$

Any difference in weight should be adjusted in the pounds charged out each month from process to finished material. Thus the value charged out to pieces received out of process

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should be plus the value of the loss in weight. This loss would probably be known from test, where it could not be ascertained by actual inventory.

133. Wrapping Material. This should be treated as explained in sections 114 and 115. An entry should then be made:

Wrapping Material Used a/c
To Wrapping Material Stock a/c

134. Finished Material Used on Manufactured Goods (Requiring Assembling). An analysis of the cost of finished materials should be made on a form like AA, Sec. 128, in order to obtain the rate of cost at which the finished material of each brand, actually used on the manufactured goods, requiring assembling or mixing, during the month should be charged out. When this has been established and the values have been ascertained, an entry should be made:

Finished Material Used a/c quantity.....\$
 To Finished Material a/c quantity..... \$

For value and quantity of finished
material used during month on manu-
factured goods requiring assembling.

The former is a cost account, while the latter account represents the value and quantity of finished material in stock at the end of the month awaiting disposition.

135. Finished Material Used on Manufactured Goods (Not Requiring Assembling). An analysis on Form AA of the cost of finished materials should be made, as above described, in order to determine the rate of cost at which the finished material of each brand wrapped and placed in stock of manufactured goods, under the specific product names, should be charged

out. When this has been established, and the values ascertained, an entry should be made:

Finished Material Used a/c	quantity.....\$
To Finished Material a/c	quantity..... \$

For the value and quantity of finished material (not assembled) wrapped under specific product names.

136. Labor Statement. From the pay roll analysis, the labor charged out on raw material in process is entered on the labor statement, similar to Form 11, Section 171. This labor statement, however, should provide, in this case, additional vertical column divisions for each classified material charged with labor. The form should then be worked out, as shown on Form 11, Section 171, and the amount determined which is to be charged out to the labor on each finished material account.

137. Labor on Finished Material. From the labor statement, referred to in the preceding section, the labor value expended on the finished material output for the month is entered as follows through the journal:

Labor on Finished Material a/c
To Labor on Raw Material in Process a/c

The former is not one of the cost accounts. It represents the labor value on finished material awaiting disposition, and will afterwards be credited with the proper proportion charged out on material used on manufactured goods; the balance then remaining on the account would represent the labor value contained in the finished material awaiting final disposition (either by assembling or wrapping).

The labor value charged out to finished material should be entered in the proper proportion on the second line of each division on Form AA, Section 128.

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138. Labor on Finished Material Used. From the form described in Section 172, the labor value on the finished material used on manufactured goods would be obtained. This would cause entry to be made:

Labor on Finished Material Used a/c
To Labor on Finished Material a/c

For the value of labor used on
finished material (assembled and wrapped)
used on manufactured goods for the month.

The values and quantities would then be transferred respectively from the fourth line of each division on Form AA to the second line of each division on Form BB, for that portion which was not assembled; for that portion which was used on manufactured goods requiring assembling, the figures (quantities and values) would be transferred from the fifth line of each division on Form AA, Section 128, to the respective divisions on Form CC, Section 129 (cost analysis of manufactured goods requiring assembling).

139. Labor Assembling (or Mixing). The labor charge for the "assembling" of the various finished materials, in order to manufacture some other distinct product, may just as well be charged out in its entirety each month to the goods actually completed during the month. The labor may be charged specifically to the different kinds of articles or brands, or it may be apportioned over all on the basis of labor or production.

From the pay roll analysis, or the labor statement, the items of labor assembling would be transferred to their respective columns on Form CC, Section 129, and entry would be made:

Labor Assembling Used a/c
To Labor Assembling a/c

In case the entire labor assembling is charged out to manufactured goods for the month, the latter account is not necessary,

as the labor is then distributed from the Pay Roll Account direct to Labor Assembling Used Account. Where a portion of the labor assembling is held back as a charge against the incomplete work, the Labor Assembling Account, as a financial account, is necessary.

140. Overhead Expense. The overhead should be charged as specifically as possible over the various articles manufactured, and, except where specifically applicable to "assembling," should be charged against, and become a part of the value of the finished material. In the ledger, the overhead accounts should be general, such as General Factory Expense Account, Repairs and Renewals Account, etc. In this class of cost finding, the balances of these overhead accounts should be apportioned over the products on the basis of labor or production, after, of course, that part of the overhead which was specific had been applied specifically.

Overhead specifically relating to the assembling room should be charged to the Assembling Expense Account. The balance of this account would be a charge against the assembled products, either in its entirety or proportionately—the former preferred. General overhead is best not apportioned to this account.

After all entries have been made for the month to the debit of the overhead accounts, the month's net balances of these accounts should be entered on a distribution and apportionment sheet, like Form DD below. The distribution of the specific overhead is then made over the different finished materials and the Assembling Expense Account.

The amounts applying generally are put into another column and apportioned on the basis of wages or production. The basis must, of course, be first determined and the percentage ascertained at which the general overhead applicable to each specific finished material should be apportioned. These percentages should be noted at the tops of the respective columns

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on Form DD. One such form should be allotted to each classified expense account.

The classified expense accounts to be charged through the voucher record and the journal during the month might be:

Repairs and Renewals	a/c
Rent, Depreciation, Taxes, Insurance, and Power (all in separate accounts if desired)	"
General Factory Expense	"
General Office Expense	"
Administration	"
Selling Expense	"
 To Accounts Payable	a/c
Unexpired Insurance	"
Provision for Taxes	"
Reserve for Depreciation	"

The distribution totals applying to the classified finished materials are transferred to their respective places on the analysis of finished material, Form AA, Section 128. The overhead applied against the Assembling Expense Account is first apportioned over the assembled manufactured products, and the portions thus established are transferred to their respective divisions, columns and lines on Form CC, Section 129. To balance the expense accounts, the following entry is made:

Overhead or Finished Material a/c	
Assembling Expense	"
 To Repairs and Renewals	a/c
Deprec., Taxes, Rent, Ins. and Power	"
General Factory Expense	"
General Office Expense	"
Administration	"
Selling Expense	"

In the above entry, the debit to the Assembling Expense Account would represent merely the distribution of charges made originally to some other classified expense account. The

GENERAL FACTORY EXPENSE ACCOUNT.

FORM DD

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charges would be those established on Form DD, as shown above. The Assembling Expense Account would also have to be apportioned on Form DD over the various products.

From the figures shown on the fourth and fifth lines of each division on the cost analysis of finished material, Form AA, Section 128, an entry would be made:

Repairs and Renewals Used	a/c
Deprec., Taxes, Rent, Ins. and Power Used	"
General Office Expense Used	"
Administration Used	"
Selling Expenses Used	"

To Overhead on Finished Material a/c

The former would be the cost accounts. The balance of the latter account would represent the value of the overhead contained in the finished material awaiting disposition.

141. Labor Wrapping (Packing, Labeling, etc.). After apportionment of the charges for this operation, the figures should appear in the proper place of each division on the manufactured goods analyses (Forms BB and CC).

The charge for wrapping should be specifically ascertained as to each brand and each size of container for each brand, as explained in Sections 175 and 176, Forms 15 and 16. After the charges have been definitely established, an entry should be made:

Labor Wrapping Used a/c
To Labor Wrapping a/c

142. Manufactured Goods. From the cost analyses of manufactured goods, as per forms BB and CC, Section 129, an entry should be made from the total of the figures representing the cost of goods manufactured during the month, as follows:

Manufactured Goods a/c
To Manufacturing a/c

This entry places among the financial accounts the value of the goods manufactured during the month, and establishes for the cost accounts a controlling account.

143. Cost of Sales. From the analyses of manufactured goods, the entry for the total cost of sales would be:

Cost of Sales a/c
To Manufactured Goods a/c

This entry relieves the latter account of the value of the manufactured goods sold during the month.

144. Sales. From the sales record for the month, the following entry should be made:

Accounts Receivable a/c
To Sales a/c

145. Closing the Accounts. At the end of the fiscal period, the accounts should be closed by journal entry as follows:

Manufacturing a/c

To Finished Material Used	a/c
Labor on Fin. Mat. Used	"
Labor Assembling Used	"
Labor Wrapping Used	"
Flavoring Used	"
Repairs and Renewals Used	"
Depreciation, Taxes, Rent, Ins. and Power Used	"
General Office Expense Used	"
General Factory Expense Used	"
Administration Used	"
Selling Expense Used	"

The balances of the latter accounts would represent the cost of the manufactured goods for the period. The above entry would balance both the cost accounts and the cost controlling account.

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The next entry should be to transfer the balance of the Cost of Sales Account to Sales Account, and, after this has been done, the balance of Sales Account should be transferred to Loss and Gain Account. The balance of this latter account is then transferred to Surplus Account, and this would complete the closing of the books for the period.

CHAPTER VIII.

ILLUSTRATION OF DEPARTMENTAL COST ACCOUNTS.

146. General Remarks and Data Necessary for the Cost Work.
In the following practical illustration of departmental cost finding, it is assumed that a company starts operations January 1, 1915, and that the cost accounting shown is for the month of January.

It is not intended to be typical of any manufactured article, but to convey, in a simple manner, the general principles upon which cost finding of this type is based. The details and the names of the accounts may be readily changed to suit the analysis desired, and this may be worked out to a much greater degree either by enlarging the forms or by the use of auxiliary forms.

In this illustration, it is assumed that the work which the company undertakes is estimated upon, these estimates being made the basis for the prices billed to the customers on completion of the work. The hour of productive time is applied as the unit of measure since the element of uniform reproduction is lacking.

There will be three departments, in each of which the unit of measure will be one hour (man hour) of the specific department. The material will be purchased either specifically for the work (in this case called "merchandise") or will be obtained from stock carried by the company (in which case it will be called "Raw Material"). The time will be shown in hours and minutes, and not in hours and tenths of hours.

The ordinary cash book, ledger and journal, and a voucher

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record will be used. The cost analyses will be taken up on loose forms, which should later be placed in binders for reference. No cost journal or ledger will be used, the cost accounts being kept in the general ledger.

The information necessary as the basis for the cost work is as follows:

(a) *Cost Value of Material Put Into Work During the Month.* This is obtained from the record of the daily recapitulation of the material requisitions, as described in Section 92. The total value is entered on Form 1, Section 152. For the convenience of illustration (and since the job summary forms described in Section 94 would here contain only items affecting the current month's work) Form 1, Section 152 is used as a recapitulation of the items appearing on the job summary forms for both the completed work and the work still in process. The totals of columns 3 and 4 should, in this case, agree with the value of the material put into process or work during the month.

(b) *Cost Value of Merchandise Put Into Work During the Month.* This information is obtained from the daily recapitulation record of the merchandise requisitions as explained in paragraph (a) of this section.

(c) *Productive Hours of Each Department for the Month.* The productive time for the month is obtained from the record of the daily recapitulation of the time tickets. (See Section 93).

(d) *Apportionment of the General Overhead to the Departments.* The overhead will be distributed on the basis of department labor. (See Form 3, Section 154.) In order to avoid too much detail, no attempt is made to apportion power, rent, insurance, etc., specifically as provided for in Section 63.

(e) *Cost Value of Material Used on Work Completed*

During the Month. This information is obtained from the recapitulation of the material columns of the job summary forms covering work completed during the month (as described in Section 94). For convenience, these data are here summarized on Form 1, Section 152.

(f) *Cost Value of Merchandise Used on Work Completed During the Month.* See paragraph (e) above.

(g) *Productive Hours of Each Department Used on Work Completed During the Month.* This information is obtained from the job summary forms (see Section 94) covering jobs completed during the month. See Form 1, Section 152, showing the recapitulation of this information.

(h) *Application of the Overhead to the Completed Work.* For this, see Form 2, Section 153, and Form 3, Section 154.

(i) *Cost Value of Material Remaining in Process at the End of the Month.* A recapitulation of the material columns of the job summary forms, covering work not completed during the month, will give this information.

(j) *Cost Value of Merchandise Remaining in Process at the End of the Month.* See paragraph (i) above.

(k) *Productive Hours of Each Department on Work Remaining in Process.* This is obtained from a recapitulation of the totals of the time columns on the job summary forms covering work not completed during the month. (See Section 94.) See Form 1, Section 152.

147. Preliminary Trial Balance and Journal Entries. At the close of the operations for the month, the preliminary trial balance, shown below, was taken from the company's books. From this and the data obtained from the requisition and time ticket recapitulations and the job summary forms covering

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completed work and work still in process at the end of the month, the cost work will be taken up:

PRELIMINARY TRIAL BALANCE

Cash	652 01
Plant and Equipment.....	31,800 00
Material Stock.....	6,750 00
Merchandise on Work in Process.....	900 00
Supplies Stock (\$120 of this will be charged out to General Factory Expense Account for January).....	620 00
Unexpired Insurance (\$5 to be charged out to Gen- eral Office Expense Account and \$70 to General Factory Expense Account for January).....	900 00
Provision for Interest (\$10 to be charged out to General Office Expense Account for January).....	40 00
Pay Roll (distributed through V/Record).....	
Dep't A, Labor on Work in Process: 3000 hours, — min.....	1,200 00
Dep't B, Labor on Work in Process: 2000 hours, — min.....	900 00
Dep't C, Labor on Work in Process: 1500 hours, — min.....	450 00
General Factory Expense.....	385 00
Repairs and Renewals, General.....	50 00
Dep't A, Expense.....	80 00
Dep't B, Expense.....	40 00
Dep't C, Expense.....	10 00
Shipping Expense.....	120 00
General Office Expense.....	200 00
Administration	400 00
Selling Expense.....	345 00
Accounts Payable.....	8,790 00
Discount	52 01
Bills Payable.....	2,000 00
Capital Stock.....	40,000 00
	\$45,842 01
	\$45,842 01

Allowance for depreciation will be, say, \$250 per month, of which \$245 is to be charged to General Factory Expense Account and \$5 to General Office Expense Account.

From the factory records of supplies, and the schedules of insurance, taxes, depreciation, interest charges, etc., an entry is made for the month's proportion of these charges:

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General Factory Expense.....	435 00
To Supplies Stock.....	120 00
Unexpired Insurance.....	70 00
Reserve for Depreciation.....	245 00

Monthly proportion charged out for January (See notes on preliminary trial balance).

and then:

General Office Expense.....	20 00
To Unexpired Insurance.....	5 00
Provision for Interest.....	10 00
Reserve for Depreciation.....	5 00

Monthly proportion charged out for January.

148. Material and Merchandise Value Disbursed, Used and Remaining in Process. From the record of the daily recapitulation of the material requisitions, the value of the raw material put into work during the month is ascertained and an entry is made as follows:

Material on Work in Process.....	3500 00
To Material Stock.....	3500 00
Material from stock put into work during January. See form 1, section 152, totals of columns 3 and 4.	

Merchandise is the material bought specifically for the jobs. The recapitulation of the "merchandise" column of the job summary forms covering work completed during the month, will give the total value of the merchandise used on completed work. See Form 1, Section 152. Entry is made for this as follows:

Merchandise Used.....	700 00
To Merchandise on Work in Process.....	700 00
For merchandise bought for specific jobs and used on work completed in January. See form 1, section 152, total of column 6.	

From the recapitulation of the totals of the material columns of the job summary forms (Section 94) covering work com-

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pleted during the month, the figures are obtained for the value of the material used. Entry is then made:

Material Used.....	2000 00
To Material on Work in Process.....	2000 00
For cost of raw material used on completed work. See form 1, section 152, total of column 4.	

149. Labor Value Used on Completed Work. All "direct" labor (productive and unproductive wages paid to skilled operators) of each department, as per pay roll, is charged to the respective Department Labor on Work in Process Accounts. The time is also charged to these accounts, but for the productive time only, which is obtained from the daily recapitulation record of the time tickets.

To obtain information as to the productive hours and the labor value to be charged out to work completed during the month, a recapitulation should be made of the totals of the time columns of each department on the job summary forms covering work completed during the month. The totals of time thus found for each department are entered on Form 2, Section 153, on the proper lines and in the proper column and divisions. The calculation is then made (using the labor cost rates per hour established for the different departments on Form 2, Section 153, as the proper rates at which completed work should be charged) and the values inserted in the labor column of each division. Entry is then made as follows:

Dept. A, Labor Used 2200 hrs.....	\$880 00
Dept. B, Labor Used 1500 hrs.....	675 00
Dept. C, Labor Used 1200 hrs.....	360 00
To Dept. A, Labor on Wk in Process (hrs. above)	880 00
Dept. B, Labor on Wk in Process (hrs. above)	675 00
Dept. C, Labor on Wk in Process (hrs. above)	360 00

Being for "direct" labor charged out for the month to completed work. See form 1, section 152, columns 8, 10 and 12 as to time. See form 2, section 153, totals of column 2, lines d, i and n.

150. Overhead on Work in Process and Overhead Used. A portion of the overhead is applicable to finished work and a portion to the work remaining in process at the end of the month. Since Form 2, Section 153, shows a full analysis of this overhead, the balances for the month of the overhead accounts are centralized in one account—Overhead on Work in Process Account:

Production Overhead Exp. on Work in Process

Dept. A.....	545 30
Dept. B.....	386 50
Dept. C.....	188 20
	<u>1120 00</u>
To Dept. A Expense.....	80 00
Dept. B Expense.....	40 00
Dept. C Expense.....	10 00
General Factory Expense.....	820 00
Repairs and Renewals, General.....	50 00
Shipping Room Expense.....	120 00

Being for balances transferred from the latter accounts to the former account. See form 2, col. 3, lines b, g and l. See form 3, total of columns 2, 4 and 6.

And then:

Supplementary Overhead Exp. on Work in Process

Dept. A.....	453 55
Dept. B.....	337 75
Dept. C.....	173 70
	<u>965 00</u>
To General Office Expense.....	220 00
Administration	400 00
Selling Expense.....	345 00

For balances of the latter accounts transferred to the former account. See form 2, col. 11, lines b, g and l. See form 3, totals of cols. 3, 5 and 7.

On Form 2, Section 153, the respective overhead expenses charged out (used) for the month for each department to com-

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pleted work are ascertained. For the amounts thus charged to completed work, an entry should be made as follows:

Dept. A, Production Overhead Exp. Used.....	399 90
Dept. B, Production Overhead Exp. Used.....	289 87
Dept. C, Production Overhead Exp. Used.....	150 56
Dept. A, Supplementary Overhead Exp. Used.....	332 61
Dept. B, Supplementary Overhead Exp. Used.....	253 30
Dept. C, Supplementary Overhead Exp. Used.....	138 96
To Production Overhead Exp. on Work in Process.	840 38
Supply. Overhead Exp. on Work in Process....	724 87

For the value of production and supplementary overhead charged out for the month to work completed during the month. See form 2, cols. 3, 4, 5 and 6, lines d, i and n. See form 2, col. 11, lines d, i and n.

151. Finished Work. Form 2, Section 153 gives a full analysis of the hours and values of each department applied to work completed during the month. From the figures thus shown, make entry:

MANUFACTURED GOODS A/C.....	6180 20
Material Used.....	2000 00
Merchandise Used.....	700 00
Dept. A, Labor Used.....	880 00
Dept. B, Labor Used.....	675 00
Dept. C, Labor Used.....	360 00
Dept. A, Prod. O/H Used.....	399 90
Dept. B, Prod. O/H Used.....	289 87
Dept. C, Prod. O/H Used.....	150 56
Dept. A, Suppl. O/H Used.....	332 61
Dept. B, Suppl. O/H Used.....	253 30
Dept. C, Suppl. O/H Used.....	138 96
TO MANUFACTURING A/C.....	6180 20

For the cost of goods manufactured during January, and to place among the financial accounts, as an asset, the cost of goods manufactured during the month. Manufactured Goods Account is charged only with the value of the finished work. See form 4, total of column 10.

152. Form 1, Page 134-a, Summary of Material, Merchandise and Labor Hours. By recapitulating and recording daily the values of material and merchandise disbursed, and also the productive hours of each department from the time tickets, the totals of these are readily available for the cost work. From the job summary forms, one recapitulation of the respective columns should be made at the end of the month from the forms covering work completed during the month and another like recapitulation should be made from those forms covering work remaining in process. For this, Form 1 may be used. The summary on this form for the finished work furnishes the basis for the entries in sections 148 and 149. The totals of the hours in the "In Process" columns on the form should agree with the inventory shown on Form 2, Section 153, and should be checked up with the record of the daily recapitulation. The totals of the "In Process" columns for the material and merchandise should agree with the respective balances of the ledger accounts for these items. The totals for "Finished Work" appearing on this form are transferred to Form 2, Section 153.

153. Form 2, Page 134-b, Cost Analysis of Work in Process, etc. This form serves the purpose of separating the monthly output of completed work from the work remaining in process, and it establishes the rates of cost for each classified expense for each department. Each division on the form represents a department.

The first line of each division represents the inventory, if any, at the first of the month.

The second line of each division represents the "put into process during the month."

The first and second lines are totaled. The hours and minutes are divided into the values and the rates of cost are obtained for each department, and for each classified expense,

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at which to charge out the hours used on completed work, as shown on line d-2 and corresponding lines of the other divisions. The time and values entered on the second line of each division are obtained partly from the record of the daily recapitulations of time and material tickets, the classified ledger accounts and Form 3, Section 154.

The third line of each division, as explained above, represents the total of the first two lines of each, or, if there was no inventory at the first of the month, the figures on the third line would be identical with the figures entered on the second line.

On the fourth line of each division, the time is obtained from Form 1, Section 152. The values on this line of each division are obtained by multiplying the time of each by the respective rates of cost, as shown in the rate columns on the third line of each division. The values thus obtained are transferred to Form 4, Section 155, Record of Completed Work.

The total of the figures shown on lines d-12, j-12 and n-12, together with the material and merchandise values in columns 4 and 6, Form 1, Section 152, furnish the basis for the entry shown in Section 151.

154. Form 3, Apportionment of Indirect Expense. To this form are transferred the debit balances of the general overhead accounts, and the apportionment is made on the basis of labor. The apportioned items are then transferred to Form 2, Section 153.

The totals of columns 2, 4 and 6, on Form 3, together with the charges to the Department Expense Accounts shown on Form 2, Section 153, serve as the basis for the entry in Section 150.

The totals of columns 3, 5 and 7, on Form 3, furnish the basis for the entry also shown in Section 150.

FORM No. 1
MATERIAL,]

(1)

Job
No.

50
51
52
53
54
55
56
57
58
59

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at which to charge out the hours used on completed work, as shown on line d-2 and corresponding lines of the other divisions. The time and values entered on the second line of each division are obtained partly from the record of the daily recapitulations of time and material tickets, the classified ledger accounts and Form 3, Section 154.

The third line of each division, as explained above, represents the total of the first two lines of each, or, if there was no inventory at the first of the month, the figures on the third line would be identical with the figures entered on the second line.

On the fourth line of each division, the time is obtained from Form 1, Section 152. The values on this line of each division are obtained by multiplying the time of each by the respective rates of cost, as shown in the rate columns on the third line of each division. The values thus obtained are transferred to Form 4, Section 155, Record of Completed Work.

The total of the figures shown on lines d-12, j-12 and n-12, together with the material and merchandise values in columns 4 and 6, Form 1, Section 152, furnish the basis for the entry shown in Section 151.

154. Form 3, Apportionment of Indirect Expense. To this form are transferred the debit balances of the general overhead accounts, and the apportionment is made on the basis of labor. The apportioned items are then transferred to Form 2, Section 153.

The totals of columns 2, 4 and 6, on Form 3, together with the charges to the Department Expense Accounts shown on Form 2, Section 153, serve as the basis for the entry in Section 150.

The totals of columns 3, 5 and 7, on Form 3, furnish the basis for the entry also shown in Section 150.

FORM No. 1
MATERIAL, I

(1)	
Job No.	
50	
51	
52	
53	
54	
55	
56	
57	
58	
59	

APPORTIONMENT OF INDIRECT (OVERHEAD) EXPENSE

For the Month of January, 1915

Form 3

Form 3

	1	2	3	4	5	6	7
	Dept. "A"		Dept. "B"		Dept. "C"		
	47%		35%		18%		
	Total	Prod. Over- head	Suppl. Over- head	Prod. Over- head	Suppl. Over- head	Prod. Over- head	Suppl. Over- head
Rep. and Renewals.....	50 00	23 50		17 50		9 00	
General Fact. Exp.....	820 00	385 40		287 00		147 60	
Shipping Exp.....	120 00	56 40		42 00		21 60	
General Office Exp.....	220 00		103 40		77 00		39 60
Administration	400 00		188 00		140 00		72 00
Selling Exp.....	345 00		162 15		120 75		62 10
	1,955 00	465 30	453 55	346 50	337 75	178 20	173 70

155. Form 4, Page 136-a, Record of Finished (Completed) Work. This record shows the cost of each finished job.

To this form, the hours and minutes of each department used on each finished job are transferred from Form 1, Section 152, direct; or, from the job summary forms.

The departmental rates of cost are obtained from Form 2, Section 153. The time of each department multiplied by its respective departmental rate of cost, shown at the head of the columns, will give the departmental cost. The value of the material and merchandise used is obtained from Form 1, Section 152 or, direct from the job summary forms.

As the jobs are billed, the figures from this record of com-

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pleted work are transferred to the sales book, Form 5, Section 156, and are entered in the columns provided thereon for the cost of sales analysis.

A record of completed work is not absolutely necessary where the work is billed as finished.

The totals of columns 5, 6 and 7, should agree with the respective totals on Form 2, Section 153, lines d-12, j-12 and n-12.

Totals of columns 8 and 9 should agree with totals of columns 4 and 6, Form 1, Section 152.

It may be that slight adjustments (a few cents) will be necessary to make them agree. Such a discrepancy would be due to not having carried the decimal far enough in the cost rates. The adjustment may be applied over one or more of the jobs, or entered on a line at the bottom.

156. Form 5, Page 136-b, Analysis of Sales. This form serves a double purpose.

It shows the sales on one side departmentally at the sales value and on the other side the analyzed cost of the sales in like manner for each job. Slight adjustments may have to be made on the cost analysis side, as explained in the preceding section.

Where a record of finished work is kept, the cost of sales data are obtained from it; otherwise, from the job summary forms.

The sales analysis is obtained from the job cost forms, described in Section 100. From the sales book, or sales form, as shown on Form 5, the statements of departmental profits, etc., may be readily obtained.

From the sales book are obtained the figures for the two final entries, which are as follows:

Cost of Sales.....	5,819 90
To Manufactured Goods.....	5,819 90
For the cost of goods sold, as per sales book, transferred from the latter to the former at cost.	

3 - 2 - 100

СЕР. 7947-141 40 НТУОМ ЗИТ 805 1997

TABLE II
EFFECT OF CROWN POLYMER CONCENTRATION AND MONOMER CONCENTRATION ON THE POLYMERISATION RATE

Crown polymer concentration, g./l.	Monomer concentration, g./l.	Rate of polymerisation, %/hr.			d.f. s.d.
		1	2	3	
0.000	0.000	0.00	0.00	0.00	0.00
0.000	0.005	0.00	0.00	0.00	0.00
0.000	0.010	0.00	0.00	0.00	0.00
0.000	0.020	0.00	0.00	0.00	0.00
0.000	0.040	0.00	0.00	0.00	0.00
0.000	0.080	0.00	0.00	0.00	0.00
0.000	0.160	0.00	0.00	0.00	0.00
0.000	0.320	0.00	0.00	0.00	0.00
0.000	0.640	0.00	0.00	0.00	0.00
0.000	1.280	0.00	0.00	0.00	0.00
0.000	2.560	0.00	0.00	0.00	0.00
0.000	5.120	0.00	0.00	0.00	0.00
0.000	10.240	0.00	0.00	0.00	0.00
0.000	20.480	0.00	0.00	0.00	0.00
0.000	40.960	0.00	0.00	0.00	0.00
0.000	81.920	0.00	0.00	0.00	0.00
0.000	163.840	0.00	0.00	0.00	0.00
0.000	327.680	0.00	0.00	0.00	0.00
0.000	655.360	0.00	0.00	0.00	0.00
0.000	1310.720	0.00	0.00	0.00	0.00
0.000	2621.440	0.00	0.00	0.00	0.00
0.000	5242.880	0.00	0.00	0.00	0.00
0.000	10485.760	0.00	0.00	0.00	0.00
0.000	20971.520	0.00	0.00	0.00	0.00
0.000	41943.040	0.00	0.00	0.00	0.00
0.000	83886.080	0.00	0.00	0.00	0.00
0.000	167772.160	0.00	0.00	0.00	0.00
0.000	335544.320	0.00	0.00	0.00	0.00
0.000	671088.640	0.00	0.00	0.00	0.00
0.000	1342177.280	0.00	0.00	0.00	0.00
0.000	2684354.560	0.00	0.00	0.00	0.00
0.000	5368709.120	0.00	0.00	0.00	0.00
0.000	10737418.240	0.00	0.00	0.00	0.00
0.000	21474836.480	0.00	0.00	0.00	0.00
0.000	42949672.960	0.00	0.00	0.00	0.00
0.000	85899345.920	0.00	0.00	0.00	0.00
0.000	171798691.840	0.00	0.00	0.00	0.00
0.000	343597383.680	0.00	0.00	0.00	0.00
0.000	687194767.360	0.00	0.00	0.00	0.00
0.000	1374389534.720	0.00	0.00	0.00	0.00
0.000	2748779069.440	0.00	0.00	0.00	0.00
0.000	5497558138.880	0.00	0.00	0.00	0.00
0.000	10995116277.760	0.00	0.00	0.00	0.00
0.000	21990232555.520	0.00	0.00	0.00	0.00
0.000	43980465111.040	0.00	0.00	0.00	0.00
0.000	87960920222.080	0.00	0.00	0.00	0.00
0.000	175921840444.160	0.00	0.00	0.00	0.00
0.000	351843680888.320	0.00	0.00	0.00	0.00
0.000	703687361776.640	0.00	0.00	0.00	0.00
0.000	1407374723553.280	0.00	0.00	0.00	0.00
0.000	2814749447106.560	0.00	0.00	0.00	0.00
0.000	5629498894213.120	0.00	0.00	0.00	0.00
0.000	11258997788426.240	0.00	0.00	0.00	0.00
0.000	22517995576852.480	0.00	0.00	0.00	0.00
0.000	45035991153704.960	0.00	0.00	0.00	0.00
0.000	90071982307409.920	0.00	0.00	0.00	0.00
0.000	180143964614819.840	0.00	0.00	0.00	0.00
0.000	360287929229639.680	0.00	0.00	0.00	0.00
0.000	720575858459279.360	0.00	0.00	0.00	0.00
0.000	144115171691859.720	0.00	0.00	0.00	0.00
0.000	288230343383719.440	0.00	0.00	0.00	0.00
0.000	576460686767438.880	0.00	0.00	0.00	0.00
0.000	1152921373534877.760	0.00	0.00	0.00	0.00
0.000	2305842747069755.520	0.00	0.00	0.00	0.00
0.000	4611685494139511.040	0.00	0.00	0.00	0.00
0.000	9223370988279022.080	0.00	0.00	0.00	0.00
0.000	18446741976558044.160	0.00	0.00	0.00	0.00
0.000	36893483953116088.320	0.00	0.00	0.00	0.00
0.000	73786967906232176.640	0.00	0.00	0.00	0.00
0.000	147573935812464353.280	0.00	0.00	0.00	0.00
0.000	295147871624928706.560	0.00	0.00	0.00	0.00
0.000	590295743249857413.120	0.00	0.00	0.00	0.00
0.000	1180591486497714826.240	0.00	0.00	0.00	0.00
0.000	2361182972995429652.480	0.00	0.00	0.00	0.00
0.000	4722365945990859304.960	0.00	0.00	0.00	0.00
0.000	9444731891981718609.920	0.00	0.00	0.00	0.00
0.000	18889463783963437219.840	0.00	0.00	0.00	0.00
0.000	37778927567926874439.680	0.00	0.00	0.00	0.00
0.000	75557855135853748879.360	0.00	0.00	0.00	0.00
0.000	15111571027170749758.720	0.00	0.00	0.00	0.00
0.000	30223142054341499517.440	0.00	0.00	0.00	0.00
0.000	60446284108682999034.880	0.00	0.00	0.00	0.00
0.000	12089256821736599806.960	0.00	0.00	0.00	0.00
0.000	24178513643473199613.920	0.00	0.00	0.00	0.00
0.000	48357027286946399227.840	0.00	0.00	0.00	0.00
0.000	96714054573892798455.680	0.00	0.00	0.00	0.00
0.000	193428109147785596911.360	0.00	0.00	0.00	0.00
0.000	386856218295571193822.720	0.00	0.00	0.00	0.00
0.000	773712436591142387644.440	0.00	0.00	0.00	0.00
0.000	1547424873182284773288.880	0.00	0.00	0.00	0.00
0.000	3094849746364569546577.760	0.00	0.00	0.00	0.00
0.000	6189699492729139093155.520	0.00	0.00	0.00	0.00
0.000	1237939898545827818631.040	0.00	0.00	0.00	0.00
0.000	2475879797091655637262.080	0.00	0.00	0.00	0.00
0.000	4951759594183311274524.160	0.00	0.00	0.00	0.00
0.000	9903519188366622549048.320	0.00	0.00	0.00	0.00
0.000	19807038376733245098976.640	0.00	0.00	0.00	0.00
0.000	39614076753466490197953.280	0.00	0.00	0.00	0.00
0.000	79228153506932980395906.560	0.00	0.00	0.00	0.00
0.000	158456307013865960791813.120	0.00	0.00	0.00	0.00
0.000	316912614027731921583626.240	0.00	0.00	0.00	0.00
0.000	633825228055463843167252.480	0.00	0.00	0.00	0.00
0.000	126765045611092768633404.960	0.00	0.00	0.00	0.00
0.000	253530091222185537266808.320	0.00	0.00	0.00	0.00
0.000	507060182444371074533616.640	0.00	0.00	0.00	0.00
0.000	101412036488874214906723.280	0.00	0.00	0.00	0.00
0.000	202824072977748429813446.560	0.00	0.00	0.00	0.00
0.000	405648145955496859626893.120	0.00	0.00	0.00	0.00
0.000	811296291910993719253786.240	0.00	0.00	0.00	0.00
0.000	162259258382198743850772.480	0.00	0.00	0.00	0.00
0.000	324518516764397487701544.960	0.00	0.00	0.00	0.00
0.000	649037033528794975403088.320	0.00	0.00	0.00	0.00
0.000	1298074067057589950806176.640	0.00	0.00	0.00	0.00
0.000	259614813411517990161235.280	0.00	0.00	0.00	0.00
0.000	519229626823035980322470.560	0.00	0.00	0.00	0.00
0.000	103845925364607196064490.120	0.00	0.00	0.00	0.00
0.000	207691850729214392128980.240	0.00	0.00	0.00	0.00
0.000	415383701458428784257960.480	0.00	0.00	0.00	0.00
0.000	830767402916857568515920.960	0.00	0.00	0.00	0.00
0.000	1661534805833715137031841.920	0.00	0.00	0.00	0.00
0.000	3323069611667430274063683.840	0.00	0.00	0.00	0.00
0.000	6646139223334860548127367.680	0.00	0.00	0.00	0.00
0.000	1329227844666972109625475.360	0.00	0.00	0.00	0.00
0.000	2658455689333944219250950.720	0.00	0.00	0.00	0.00
0.000	5316911378667888438501901.440	0.00	0.00	0.00	0.00
0.000	1063382275733577687700382.880	0.00	0.00	0.00	0.00
0.000	2126764551467155375400765.760	0.00	0.00	0.00	0.00
0.000	4253529102934310750801531.520	0.00	0.00	0.00	0.00
0.000	8507058205868621501603063.040	0.00	0.00	0.00	0.00
0.000	1701411641173724300326126.080	0.00	0.00	0.00	0.00
0.000	3402823282347448600652252.160	0.00	0.00	0.00	0.00
0.000	6805646564694897201304504.320	0.00	0.00	0.00	0.00
0.000	1361129312938975440260908.640	0.00	0.00	0.00	0.00
0.000	2722258625877950880521817.280	0.00	0.00	0.00	0.00
0.000	5444517251755901761043634.560	0.00	0.00	0.00	0.00
0.000	1088903453511180352208728.120	0.00	0.00	0.00	0.00
0.000	2177806907022360704417456.240	0.00	0.00	0.00	0.00
0.000	4355613814044721408834912.480	0.00	0.00	0.00	0.00
0.000	8711227628089442817669824.960	0.00	0.00	0.00	0.00
0.000	1742245525617888563533964.920	0.00	0.00	0.00	0.00
0.000	3484491051235777127067928.840	0.00	0.00	0.00	0.00
0.000	6968982102471554254135856.680	0.00	0.00	0.00	0.00
0.000	1393796420494310850827772.360	0.00	0.00	0.00	0.00
0.000	2787592840988621701655544.720	0.00	0.00	0.00	0.00
0.000	5575185681977243403311088.480	0.00	0.00	0.00	0.00
0.000	1115037136395448680662217.960	0.00	0.00	0.00	0.00
0.000	2230074272790897361324435.920	0.00	0.00	0.00	0.00
0.000	4460148545581794722648871.840	0.00	0.00	0.00	0.00
0.000	8920297091163589445297743.680	0.00	0.00	0.00	0.00
0.000	1784059418232717889059527.360	0.00	0.00	0.00	0.00
0.000	3568118836465435778119054.720	0.00	0.00	0.00	0.00
0.000	7136237672930871556238108.480	0.00	0.00	0.00	0.00
0.000	1427247534586174311247621.960	0.00	0.00	0.00	0.00
0.000	2854495069172348622495242.920	0.00	0.00	0.00	0.00
0.000	5708990138344697244980484.840	0.00	0.00	0.00	0.00
0.000	1141798027668939448996096.720	0.00	0.00	0.00	0.00
0.000	2283596055337878897992192.480	0.00			

1

193

193

193
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193

and, from the total of the charges on Form 5 to the debit of the customers:

Accounts Receivable.....	6,857 20
To Sales.....	6,857 20
As per sales book, form 5, col. 8.	

157. Form 6, Financial Statements. From Form 5, Section 156, the information as to departmental and material profits, etc., may be easily obtained and shown in the following form:

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FINANCIAL STATEMENT

Form No. 6	Form No. 6
Loss and Gain for January.	
Sales	\$6,857 20
Discount	52 01
 Total Revenue	 6,909 21
Cost of sales	5,819 90
 Gain for the month	 1,089 31
 Departmental Loss and Gain for the month.	
Department A	hrs. m.
Estimates on Work billed	1,992
Actual Cost	1,950
 Diff. between estimated and actual time	 42
Profit	363 54
Department B	
Estimates on Work billed	1,512
Actual Cost	1,500
 Diff. between estimated and actual time	 12
Profit	293 83
 Department C	
Estimates on Work billed	1,182
Actual Cost	1,150
 Diff. between estimated and actual time	 32
Profit	204 93
 Material	
Estimates on Work billed	2,000 00
Actual Cost	1,900 00
 Profit	100 00
 Merchandise	
Estimates on Work billed	725 00
Actual Cost	650 00
 Profit	75 00
 Recapitulation.	
Department A, profit	363 54
Department B, profit	293 83
Department C, profit	204 93
 Operating Profit for the month	 \$ 862 30
Material, profit	100 00
Merchandise, profit	75 00
Discount on Goods bought	52 01
 Total profit for the month	 \$1,089 31

158. Form 7, the Trading Account. The Trading Account is given below:

Form 7	TRADING ACCOUNT	Form 7
Direct Labor:		
Dept. A..... 880 00	Sales.....	6,857 20
Dept. B..... 675 00	Finished Goods on hand not	
Dept. C..... 360 00	billed.....	360 30
Material	2,000 00	
Merchandise	700 00	
Direct Expense:		
Dept. A..... 58 67		
Dept. B..... 30 00		
Dept. C..... 8 00	96 67	
Prod'n Overh'd		
R & R, Gen..... 37 56		
Gen. Fact..... 615 96		
Shipping Room.... 90 14	743 66	
Suppl. Overh'd		
Gen'l Office..... 165 26		
Administr. 300 47		
Selling 259 14	724 87	
Profit	1,037 30	
	7,217 50	7,217 50
Balance	360 30	
See form 4, col. 10, Job No. 51.		

159. The Trial Balance—Financial Accounts. The trial balance below shows only such figures as would appear upon a balance sheet:

TRIAL BALANCE (FINAL) JANUARY 31, 1915

Financial Accounts

Plant and Equipment.....	31,800 00	
Cash	652 01	
Material Stock (See form 1, col. 3).....	3,250 00	
Mdse. on Work in Process (form 1, col. 5).....	200 00	
Dpt. A Labor on Wk. in Process (form 2, col. 2, line "e").....800 hrs	320 00	
Dpt. B Labor on Wk. in Process (form 2, col. 2, line "j").....500 hrs	225 00	
Dpt. C Labor on Wk. in Process (form 2, col. 2, line "o").....300 hrs	90 00	
Supplementary Overhead on Wk. in Process (form 2, col. 11, lines "e", "j" and "o").....	240 13	
Production Overhead on Wk. in Process (form 2, cols. 3, 4, 5 and 6, lines "e", "j" and "o")	279 67	
Supplies Stock.....	500 00	
Unexpired Insurance.....	825 00	
Provision for Interest.....	30 00	
Manufactured Goods (finished work on hand,—not billed)	360 80	
Accounts Receivable (form 5, tot. col. 8).....	6,857 20	
Material on Wk. in Process (form 1, col. 8).....	1,500 00	
Cost of Sales (see below, deducted from sales).....	
SURPLUS		
Sales	6,857 20	
Cost of Sales deducted.....	5,819 90	
	1,037 30	
Discount	52 01	1,089 31
Accounts Payable.....		3,790 00
Bills Payable.....		2,000 00
Reserve for Depreciation.....		250 00
Capital Stock.....		40,000 00
	47,129 31	47,129 31

160. The Trial Balance—Cost Accounts. The trial balance shown below represents only the values used on the manufactured (completed) goods:

TRIAL BALANCE, JANUARY 31, 1915

Cost Accounts.

Dept. A, Suppl. Overhead Used.....	332 61
Dept. A, Prod'n Overhead Used.....	399 90
Dept. A, Labor Used.....	880 00
Dept. B, Suppl. Overhead Used.....	253 30
Dept. B, Prod'n Overhead Used.....	289 87
Dept. B, Labor Used.....	675 00
Dept. C, Suppl. Overhead Used.....	138 96
Dept. C, Prod'n Overhead Used.....	150 56
Dept. C, Labor Used.....	380 00
Material Used.....	2,000 00
Merchandise Used.....	700 00
Manufacturing	6,180 20

See form 2, col. 12, lines d, i and n.

See form 4, total of col. 7.

See form 4, total of col. 8.

161. Summary. The work of ascertaining cost becomes a matter of routine, more or less, month by month, and may be divided into three distinct stages:

(a) Receiving and recording the material, supplies, etc., which will eventually figure in the cost of manufacture.

(b) Proper recording of labor, material and indirect expenditures for the month.

(c) Computing the value of labor, material and indirect expense used on work completed during the month.

CHAPTER IX.

ILLUSTRATION OF PROCESS COST—SIMPLE TYPE.

162. General Remarks. It is here assumed that a company has been in operation for some time and that the cost of operations for the first month of the fiscal year is to be ascertained. Also, that the books of the company were closed as of December 31, 1914, thus closing out all cost items prior to January, 1915, the month for which the cost is to be found.

No branch accounts are shown, except as to the one item for the transfer of material.

163. Rates of Cost Averaged. The cost rates and values for goods in process at the end of December are brought forward to, and merged with the January work.

164. Raw Material. The raw material is assumed to be subjected to nearly the same processes for all brands, the chief difference in these being caused by the difference in the qualities of the materials used for each and the flavoring.

165. Labor. The labor rate on the raw material in process is assumed to be the same for all brands. Likewise, the labor rate on finished material. The labor rate for wrapping (packing, labeling, etc.) will be established for each size of package of each brand separately.

166. Overhead Expense. The total net indirect expense for the month will be charged out to manufactured goods only. The apportionment over brands will be made on the basis of production—since the labor rate is assumed to be the same for all brands.

167. Preliminary Trial Balance. After all entries in the

voucher record and the journal have been posted to the ledger, a preliminary trial balance is taken off, this trial balance showing both the nominal (which in this case will be the cost accounts) and the financial accounts.

PRELIMINARY TRIAL BALANCE

January 31, 1915.

Accounts Receivable.....		1,450 09
Plant and Equipment.....		40,000 00
Cash		15,000 00
Supplies Stock.....		500 00
Raw Material, Stock No. 1.....	15,000 lbs.	1,350 00
Raw Material, Stock No. 2.....	" 12,000 "	840 00
Raw Material Stock No. 3.....	" 6,200 "	620 00
Flavoring Stock.....		998 44
Wrapping Material Stock.....		3,000 00
Raw Material in Process.....	20,000 lbs.	1,841 18
Finished Material Stock.....	" 6,000 "	555 48
Manufactured Goods.....	" 1,175 "	454 58
Labor on Material in Process.....		2,392 67
Labor on Finished Material.....		384 00
Labor Packing, Labeling, etc. (Wrapping).....		240 20
Miscellaneous Labor.....		140 80
Repairs and Renewals.....		225 00
Power		125 00
General Factory Expense.....		460 00
Unexpired Insurance.....		900 00
Office Expense.....		400 00
Administration		500 00
Selling Expense.....		750 00
Capital Stock.....		30,000 00
1st Mortgage, 6% Bonds.....		25,000 00
Accounts Payable.....		13,047 44
Discounts		80 00
Surplus		5,000 00
	\$73,127 44	\$73,127 44

The items of miscellaneous labor, repairs and renewals and power are transferred as below.

The items of taxes, depreciation, insurance, interest on plant, etc., chargeable to the month's work are obtained from

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schedules giving the monthly proportion of such charges, and an entry is made for these as shown below.

The entry below also includes the items of supplies and flavoring values used during the month on manufactured goods:

General Factory Expense.....	855 80
To Supplies Stock.....	40 00
Provision for Taxes.....	50 00
Miscellaneous Labor.....	140 80
Provision for Depreciation.....	200 00
Repairs and Renewals.....	225 00
Power	125 00
Unexpired Insurance.....	75 00

Being expenses for January, transferred from the latter accounts to the former account.

and then:

Interest on Plant.....	125 00
Flavoring Used.....	198 44
To Provision for Bond Interest.....	125 00
Flavoring Stock.....	198 44

Proportion of the above expenses for January.

168. Form 8, Analysis of Raw Material Stock. To this form are transferred the pounds and values of each class of stock, which are put in their respective places. There are then added the purchases made during the month—pounds and values.

The figures on the form are added and the pounds of each class divided into their respective values will establish the rate per pound to be applied to the pounds of raw material put into process for the month.

The quantities put into process are ascertained from the stock records, and the weights thus found are placed in their respective places on the analysis. The pounds multiplied by the rates established for the month will give the value of the raw material put into process during the month.

A line is provided on the analysis for "raw material sold or transferred."

By deducting the figures on the fourth and fifth lines from the figures shown on line 3, the inventory at the end of the month is ascertained.

Form 8

Form 8

ANALYSIS OF RAW MATERIAL STOCK FOR JANUARY

	Stock No. 1			Stock No. 2			Stock No. 3		
	Lbs	@	\$	Lbs	@	\$	Lbs	@	\$
1 Inv. 1st of mo...	4,000	.112	448 00	3,000	.082	246 00	1,200	.142	170 00
2 Purchases	11,000	.082	902 00	9,000	.066	594 00	5,000	.09	450 00
3 Total	15,000	.09	1,350 00	12,000	.07	840 00	6,200	.10	620 00
4 In Process.....	12,250	"	1,102 50	8,900	"	623 00	3,850	"	385 00
5 Sold or trans...									
6 Inv. end of mo..	2,750	"	247 50	3,100	"	217 00	2,350	"	235 00

RECAPITULATION

Inv. 1st of mo...	8,200	864 00
Purchases	25,000	1,946 00
Total	33,200	2,810 00
Put Into Process	25,000	2,110 50
Inv. at end of mo..	8,200	699 50

From the fourth line of the recapitulation division the figures are obtained for the following entry:

Raw Material in Process.....	2,110 50
To Raw Mat. Stock No. 1—12,250 lbs.....	1,102 50
Raw Mat. Stock No. 2— 8,900 lbs.....	623 00
Raw Mat. Stock No. 3— 3,850 lbs.....	385 00

For the value of 25,000 lbs. of raw material put into process during January. See form 8.

169. Form 9, Analysis of Raw Material in Process. The form shown below starts with the inventory at the first of the month of raw material then in process for each brand.

To this are added the pounds and value of each class of raw material put into process during the month, as shown by Form 8 in the preceding section, but entered here according to the brands for which the raw material was used.

The foregoing items are then added, both as to quantity and money. The pounds of each brand divided into the respective values will establish the rates of cost for the material. Differences in weight, if any, will cause a slight adjustment in these rates. It is assumed on the form below that the net difference in weights amounts to 150 pounds for Brand A and 650 pounds for Brand B. These pounds are then deducted and the remaining pounds of each brand are divided into the values as before. The rates thus established will be the correct rates at which to charge the pounds of finished material received out of process during the month, as also any sales or transfers of finished material, etc., to branches. The form is as follows:

Form 9

ANALYSIS OF RAW MATERIAL IN PROCESS FOR JANUARY

Form 9

	Total			Brand A			Brand B		
	Rs.	c.	\$	Rs.	c.	\$	Rs.	c.	\$
1 Inventory 1st of month.....	20,000	.992059	1,841 18	9,000	.064200	847 80	11,000	.090307	993 38
2 Stock No. 1 added.....	12,250	.09	1,102 50	5,250	.09	472 50	7,000	.09	630 00
3 Stock No. 2 added.....	8,900	.07	623 00	3,400	.07	238 00	5,500	.07	385 00
4 Stock No. 3 added.....	3,850	.10	385 00	1,350	.10	2,500	1,350	.10	250 00
5 Total	45,000	.087815	3,951 68	19,000	.089121	1,693 30	26,000	.086861	2,258 38
6 Net LOSS or GAIN in weight—									
L 1,000									
G 200									
	800								
				L 150			L 650		
7 Total	44,200	.089405	3,951 68	18,350	.089830	1,693 30	25,350	.089088	2,258 38
8 Sales or Transfers.....	8,200	.089391	733 01	3,350	"	300 93	4,850	"	432 08
9 Finished material.....	20,000	.089478	1,789 66	10,500	"	943 22	9,500	"	846 34
10 Inventory at end of month.....	16,000	.089319	1,429 11	5,000	"	449 15	11,000	"	979 96

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From the eighth line of the form above, and from Form 11, Section 171, and from the factory records of supplies used, the following entry is made:

Richmond Branch.....	1,243 36
To Raw Material in Process.....	738 01
Labor on Raw Material in Process.....	485 35
Supplies Stock (bags, etc.).....	25 00

For value of 8,200 lbs. of material in process and labor on the same transferred to Richmond Branch. See form 9, line 8; form 11, section 171, lines 13 and 22.

From the figures on the ninth line of Form 9, above, the following entry is made for the pounds and value of the finished material received out of process:

Finished Material.....	1,789 56
To Raw Material in Process.....	1,789 56
For value of 20,000 lbs. finished material received out of process during January. See form 9, line 9.	

170. Form 10, Analysis of Finished Material. This form is used to determine the rate at which the finished material used on manufactured goods should be charged, and also to ascertain the value of the finished material used.

The form starts with the inventory of finished material at the first of the month—pounds and money—of each brand. To this are added the pounds and value of the finished material received out of process during the month, as per Form 9, Section 169. The total of pounds of each brand are then divided into the respective values and this establishes the rates per pound at which to charge the respective finished materials used during the month on manufactured (completed) goods. The quantity of each brand wrapped is ascertained from the records of finished stock and the proper rates applied to these quantities. The form is as follows:

Form 10

ANALYSIS OF FINISHED MATERIAL FOR JANUARY

Form 10

	Total			Brand A			Brand B				
	ls.	\$	ls.	\$	ls.	\$	ls.	\$			
1 Inventory at start of month.....	6,000	555	48	3,500	0.94200	329	70	2,500	0.90310	225	78
2 Added	20,000	1,789	56	10,500	0.89630	943	22	9,500	0.89088	846	34
3 Total	26,000	2,345	04	14,000	0.90920	1,272	92	12,000	0.89243	1,072	18
4 Wrapped	22,000	1,984	47	12,000	1,091	04	10,000	"	893	48	
5 Inventory at end of month.....	4,000	380	57	2,000	"	181	88	2,000	"	178	69

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From the above form, on line 4, the figures for the following entry are obtained:

Finished Material Used.....	1,984 47
To Finished Material Stock.....	1,984 47
For the value of 22,000 lbs. of finished material wrapped during January. See form 10, line 4.	

171. Form 11, Labor Statement. The labor statement is filled out, as to items of inventory at the first of the month (pounds and labor value) from the labor statement of the previous month.

A division is allotted to each classified process. The item of "put into process during the month" occurs only in the first process division. In the subsequent process divisions, the material and labor value received during the month from the previous process is inserted.

To the above is added the labor charged during the month. The weights are then adjusted and the rates established at which to charge the labor on the material passed on to succeeding processes and finally to labor on finished material. The labor statement is as follows:

Form 11

LABOR STATEMENT FOR JANUARY
Labor on Raw Material in Process

Form 11

Process No. 1	\$	Ibs.	Aver'e per lb.	
1 Inventory 1st of mo.....	45 00	5,000	.009000	From prev. mo.'s Labor St.
2 Put into process during mo.	250 00	25,000	.010000	From form 8, sec. 168, l. 4
3 Total	295 00	30,000	.009833	
4 Sold or Transferred.....				
5 Carried to Process No. 2..	196 67	20,000	"	From factory records
6 In Process at end of mo....	98 33	10,000	"	
Process No. 2				
7 Inventory 1st of mo.....	250 00	10,000	.025000	From last mo.'s Labor St.
8 Received from Process No. 1	196 67	20,000	.009833	From above process div.
9 Labor charged during mo... .	747 67			From Pay Roll Analysis
10 Total	1,194 34	30,000	.089811	
11 Loss or Gain in weight.....		Loss 1,000		From factory records
12 Total	1,194 34	29,000	.041184	
13 Sold or transferred.....	164 74	4,000	"	From factory records
14 Carried to Process No. 3..	823 68	20,000	"	From factory records
15 Inventory at end of mo....	205 92	5,000	"	
Process No. 3				
16 Inventory 1st of mo.....	300 00	5,000	.060000	From last mo.'s Labor St.
17 Received from Process No. 2	823 68	20,000	.041184	From above process div.
18 Labor charged during mo... .	800 00			From Pay Roll Analysis
19 Total	1,923 68	25,000	.076947	
20 Loss or Gain in weight.....		Gain 200		From factory records
21 Total	1,923 68	25,200	.076336	
22 Sold or Transferred.....	320 61	4,200	"	From factory records
23 Charged to Labor on Fin- ished Material.....	1,526 73	20,000	"	Tr'd to form 10, sec. 170
24 Inventory at end of mo....	76 34	1,000	"	
Labor Packing, Labo- ling, etc.				
25 Inventory 1st of mo.....	2 80	200	.014000	Partly wrapped as p. last mo.'s Labor Statement
26 Charged during mo.....	237 40	21,900	.010840	Labor paid during month
27 Total	240 20	22,100	.010868	
28 Goods Wrapped.....	239 20	22,000	.010872	Completely finished
29 Inventory at end of mo....	1 00	100	.010000	Partly finished
Miscellaneous Labor.....	110 00			See Trial Balance,
Shipping Labor.....	30 80			Item \$140.80

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From the figures on lines 13 and 22 of the above form, entry is made as shown in Section 169, for the labor value transferred.

From the figures on line 23, the following entry is made:

Labor on Finished Material..... 1,526 73
To Labor on Raw Material in Process..... 1,526 73
For value of labor charged in January on finished material received out of process. See form 11.

And for the labor wrapping, entry is made as follows:

Labor Wrapping..... 239 20
To Labor Packing, Labeling, etc..... 239 20
For the value of labor charged for January on material wrapped. See form 11.

172. Form 12, Analysis of Labor on Finished Material. This form starts with the labor value contained in finished material on hand at the first of the month. From Form 11, line 23, Section 171, the charge for the month is found and inserted. The rate is then established at which to charge out the labor value on finished material used during the month. From the stock records, the pounds used are ascertained and the rate applied. The form is as follows:

Form 12

ANALYSIS OF LABOR ON FINISHED MATERIAL

Form 12

	Ibs.	\$	Rate
Inventory at 1st of month.....	6,000	384 00	.064000
Labor charged during month.....	20,000	1,526 73	.076336
Total	26,000	1,910 73	.073490
Charged out for month.....	22,000	1,616 77	"
Inventory at end of month.....	4,000	293 96	"

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From line 4 of the above form, the figures are used for the following entry:

Labor on Finished Material Used.....	1,616 77
To Labor on Finished Material.....	1,616 77
For the value of labor used on manufactured goods for January. See form 12.	

173. Form 13, Analysis of Wrapping Material Used. From the factory records, the information as to the numbers of packages of each size and style used on each brand, and the values of the same, are obtained. The rate is then established by dividing the number of packages of each size used on each brand into the respective values of the wrapping material. The cost of paste, twine, etc., has been omitted here. The form is as follows:

Form 13

Form 13

ANALYSIS OF WRAPPING MATERIAL USED FOR JANUARY

	Brand A				Brand B			
	Material wrapped, Lbs.	No. pkgs. used	\$	Av. per lb.	Lbs.	No. pkgs. used	\$	Av. per lb.
2 oz. pkgs....	3,000	24,050	189 10	.062	2,000	16,015	124 00	.062
4 oz. pkgs....	6,000	24,010	324 00	.054	6,000	24,020	324 00	.054
10 oz. pkgs....	2,000	3,210	82 00	.041	1,000	1,610	41 00	.041
1 lb. pkgs....	1,000	1,006	31 00	.031	1,000	1,004	31 00	.031
	12,000	626 10			10,000		520 00	

From the figures thus obtained, the following entry is made:

Wrapping Material Used.....	1,146 10
To Wrapping Material Stock.....	1,146 10
For the value of wrapping material used in January.	
See form 13.	

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174. Form 14, Analysis of Labor Wrapping. The labor wrapping is usually paid for on some piece rate basis. From the factory records, the number of packages of each size wrapped are multiplied by the wage rates for wrapping and the amount thus ascertained for all labor wrapping should be reconciled with the pay roll analysis. The form is as follows:

Form 14

Form 14

ANALYSIS OF LABOR WRAPPING LABELING, ETC., FOR JANUARY

Sizes	Lbs.	Pkng.	La-	Mis-	Total		Brand A		Brand B								
							bel-	cel-	ane-	cts.	Rate per Pound,	Labor Paid	Lbs.	\$	Lbs.	\$	
2 oz. pkgs.....	5,000	.0050	.0080	.0060	.013600	68 00	3,000	40	80	2,000	27 20						
4 oz. pkgs.....	12,000	.0040	.0070	"	.01160	138 20	6,000	69	60	6,000	69 60						
10 oz. pkgs.....	3,000	.0080	.0040	"	.00760	22 80	2,000	15	20	1,000	7 60						
1 lb. pkgs.....	2,000	.0010	.0030	"	.00460	9 20	1,000	4	60	1,000	4 60						
Totals	22,000					239 20	12,000	180	20	10,000	169 60						

On the trial balance, Section 167, the labor wrapping charge was \$240.20. On the labor statement, Form 11, Section 171, it will be seen that \$2.80 of this amount was carried over from the previous month, and that \$239.20 was charged out during the current month, thus leaving \$1 left as a charge to partly wrapped goods at the end of the month. See trial balance, Section 180. From forms 13 and 14, the figures for the respective brands are transferred to form 15 and 16 for further analysis.

175. Form 15, Page 155, Analysis of Wrapping Material and Labor Wrapping Used on Brand A of Manufactured Goods. One such form is allotted to each brand.

On this form, the figures representing the inventory of the brand from the previous month are entered.

The figures from forms 13 and 14, sections 173 and 174, are then entered on the second line.

From the record of sales, the quantity of each size sold is inserted and multiplied by the rates established on the form. The values thus obtained represent the cost of wrapping material and labor wrapping for each size package of the particular brand.

The summarized figures on line 2 of the form are then transferred to Form 18, Section 178 and placed in their respective places.

176. Form 16, Page 156, Analysis of Wrapping Material and Labor Wrapping Used on Brand B of Manufactured Goods. The same remarks as in the preceding section apply to this form also.

BRAND A

Form 15

Form 15
Sec. 175MANUFACTURED GOODS, ANALYSIS OF
WRAPPING MATERIAL AND LABOR WRAPPING FOR JANUARY

	2 oz. Packages						4 oz. Packages					
	Wrapping Material			Labor Wrapping			Wrapping Material			Labor Wrapping		
	Lbs.	\$	Av.		\$	Av.	Lbs.	\$	Av.	\$	Av.	
Inv. 1st of mo....	1,000	65 00	.06500	20 00	.02000							
Mfd. during mo....	3,000	189 10	.06200	40 80	.01360	6,000	324 00	.054	69 60	.0116		
Total	4,000	254 10	.06352	60 80	.01520	6,000	324 00	.054	69 60	.0116		
Sales	3,000	190 58	"	45 60	"	5,000	270 00	"	58 00	"		
Inv. end of mo....	1,000	63 52	"	15 20	"	1,000	54 00	"	11 60	"		

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	10 oz. Packages						1 lb. Packages					
	Wrapping Material			Labor Wrapping			Wrapping Material			Labor Wrapping		
	Lbs.	\$	Av.	\$	Av.	Lbs.	\$	Av.	\$	Av.		
Inv. 1st of mo....	50	2 50	.05000	40	.00800	25	75	.030	15	.00600		
Mfd. during mo....	2,000	82 00	.04100	15 20	.00760	1,000	31 00	.031	4 60	.00460		
Total	2,050	84 50	.04122	15 60	.00760	1,025	31 75	.030	4 75	.00463		
Sales	2,000	82 44	"	15 22	"	1,000	30 98	"	4 63	"		
Inv. end of mo....	50	2 06	"	38	"	25	77	"	12	"		

SUMMARY OF ALL SIZES

	Wrapping Material						Labor Wrapping					
	Wrapping Material			Labor Wrapping			Wrapping Material			Labor Wrapping		
	Lbs.	\$	Av.	\$	Av.	Lbs.	\$	Av.	\$	Av.		
Inventory 1st of month.....		1,075	68 25	.063488		20 55	.019116					
Manufactured during month.....		12,000	626 10	.052175		130 20	.010850					
Total		13,075	694 35	.053105		150 75	.011529					
Sales for month.....		11,000	574 00	.052182		123 45	.011222					
Inventory at end of month.....		2,075	120 35	.053000		27 30	.013156					

Form 16

BRAND B

Form 16

Sec. 176

 MANUFACTURED GOODS, ANALYSIS OF
WRAPPING MATERIAL AND LABOR WRAPPING FOR JANUARY

	2 oz. Packages						4 oz. Packages					
	Wrapping Material			Labor Wrapping			Wrapping Material			Labor Wrapping		
	Lbs.	\$	Av.	\$	Av.	Lbs.	\$	Av.	\$	Av.		
Inv. 1st of mo....	100	1 40	.0140	1 50	.0150							
Mfd. during mo....	2,000	124 00	.0620	27 20	.0136	6,000	324 00	.0540	69 60	.0116		
Total	2,100	125 40	.0597	28 70	.0137	6,000	324 00	.0540	69 60	.0116		
Sales	2,000	119 43	"	27 33	"	5,800	313 20	"	67 28	"		
Inv. at end of mo..	100	5 97	"	1 37	"	200	10 80	"	2 32	"		

	10 oz. Packages						1 lb. Packages					
	Wrapping Material			Labor Wrapping			Wrapping Material			Labor Wrapping		
	Lbs.	\$	Av.		\$	Av.	Lbs.	\$	Av.		\$	Av.
Inv. 1st of mo....												
Mfd. during mo....	1,000	41 00	.0410	7 60	.0076		1,000	31 00	.0310	4 60	.0046	
Total	1,000	41 00	.0410	7 60	.0076		1,000	31 00	.0310	4 60	.0046	
Sales	900	36 90	"	6 84	"		800	24 80	"	3 68	"	
Inv. at end of mo..	100	4 10	"	76	"		200	6 20	"	92	"	

SUMMARY OF ALL SIZES

	Wrapping Material						Labor Wrapping					
	Wrapping Material			Labor Wrapping			Wrapping Material			Labor Wrapping		
	Lbs.	\$	Av.		\$	Av.	Lbs.	\$	Av.		\$	Av.
Inventory 1st of month.....												
Manufactured during month.....	100	1 40	.014000		1 50	.015000						
	10,000	520 00	.052000		109 00	.010900						
Total	10,100	521 40	.051623		110 50	.010940						
Sales	9,500	494 33	.052034		105 13	.011066						
Inventory at end of month.....	600	27 07	.045116		5 37	.008950						

177. Form 17, Distribution of the General Expenses Over Brands for the Month. The various debit balances for the month of the expense accounts are entered on the total line of the form below in their respective columns.

The total manufactured goods poundage is divided into each amount in order to establish the rates of cost. These rates, thus found, are then applied respectively to the pounds of each brand, and this will give the distributive amounts. The figures are then transferred to Form 18, Section 178. For convenience, the item of material appears on the form below, but these figures are obtained directly from Form 10, Section 170. The form is as follows:

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Form 17

DISTRIBUTION OF GENERAL EXPENSES OVER BRANDS

Form 17

	Mfd. lbs.	Material	Flavoring	Labor on Material	Interest on Plant
Brand A....	12,000	1,091 04	.090920	109 10 .009092	881 87 .073490
Brand B....	10,000	893 43	.089343	89 34 .008934	734 90 "
Totals....	22,000	1,984 47		198 44	1,616 77
		Gen'l Fact'y Exp., R&R, Mis- cell. Labor, Power, Ins., Supplies, etc.		Office Exp.	Administration
Brand A.....	717 71	.059809	218 19	.018181	272 73 .022727
Brand B.....	598 09	"	181 81	"	227 27 "
Totals.....	1,315 80		400 00	500 00	750 00
				Selling Exp.	

178. Form 18, Page 158-a, Analysis of Manufactured Goods and Cost of Sales. The figures appearing on this form are obtained as follows:

As to the inventory at the beginning of the month, the figures are obtained from the previous month's analysis form.

The items "Manufactured during the month" are obtained:

- As to Pounds, from form 10, line 4, section 170.
- As to Material, from form 10, line 4, section 170.
- As to Labor, from form 17, section 177.
- As to Flavoring, from form 17, section 177.
- As to Interest on Plant, from form 17, section 177.
- As to General Factory Expense, from form 17, section 177.
- As to Wrapping Material, from forms 15 and 16, sections 175 and 176.
- As to Labor Wrapping, from forms 15 and 16, sections 175 and 176.
- As to General Office Expense, from form 17, section 177.
- As to Administration, from form 17, section 177.
- As to Selling Expense, from form 17, section 177.

F

	$\mu_{\text{obs}} - \mu_{\text{ref}}$	$\sigma_{\text{obs}} - \sigma_{\text{ref}}$	$\rho_{\text{obs}} - \rho_{\text{ref}}$	χ^2/ν
B1	-0.0000	0.0000	0.0000	0.000
B2	-0.0000	0.0000	0.0000	0.000
B3	-0.0000	0.0000	0.0000	0.000

Chlorophyll = $\text{mg C} \times 1000 \times 10^{-3}$ *g chlorophyll/g C*

1. *Leucosia* *leucostoma* *leucostoma* *leucostoma* *leucostoma* *leucostoma* *leucostoma*
2. *Leucosia* *leucostoma* *leucostoma* *leucostoma* *leucostoma* *leucostoma* *leucostoma*

19. *Phragmites australis* (Cav.) Trin. ex Steud.

—
—
—
—
—

GR477-1000

PRINCIPLES AND PRACTICE OF COST ACCOUNTING 159

The pounds of each brand sold are obtained from the sales records and are entered in the pounds column of Form 18 in the respective divisions.

The rates are then established on the third line of each division at which the sold poundage should be charged out, and the pounds are multiplied by the respective rates. The inventory of the manufactured goods on hand unsold is represented on the last line of each division.

In the recapitulation division, line 2 of the total column, will be found the figures for the following entry:

Manufactured Goods a/c.....	8,275 78
Finished material used.....	1,984 47
Labor on finished material.....	1,616 77
Flavoring used.....	198 44
Interest on Plant.....	125 00
General Factory Expenses.....	1,315 80
Wrapping Material used.....	1,146 10
Labor wrapping used.....	239 20
General Office Expenses.....	400 00
Administration	500 00
Selling Expense.....	750 00
To Manufacturing a/c.....	8,275 78

For the cost of goods manufactured during January,
as per form 18.

On line 4 of the recapitulation division of Form 18, in the total column will be found the figures for the following:

Cost of Sales.....	7,712 58
To Manufactured Goods.....	7,712 58
For Cost of January Sales. See form 18.	

179. Form 19, Page 160-a, Analysis of Cost of Sales and Profits.
This form may be used to compare cost, selling value and profit of each brand, and each size package of each brand.

The figures on Form 19 are obtained from Form 18, Section 178; forms 15 and 16, sections 175 and 176, respectively, and from the sales records.

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From the total of the sales column, Form 19, the following entry is made:

Accounts Receivable.....	9,819 00
To Sales.....	9,819 00

Sales for January. See form 19.

180. Final Trial Balance of Financial Accounts and Cost Accounts. The effect of the foregoing entries and analyses is to split the trial balance into two separate and distinct trial balances, one of which is a balance sheet and the other a trial balance of the cost accounts. They are as follows:

FINAL TRIAL BALANCE

The Financial Accounts

January 31, 1915

Plant and Equipment.....	40,000 00
Cash	15,000 00
Accounts Receivable.....	11,269 09
Richmond Branch.....	1,243 36
Unexpired Insurance.....	825 00
Flavoring Stock.....	800 00
Raw Material Stock No. 1, 2750 lbs.....	247 50
Raw Material Stock No. 2, 3100 lbs.....	217 00
Raw Material Stock No. 3, 2350 lbs.....	235 00
Supplies Stock.....	435 00
Finished Material, 4000 lbs.....	860 57
Raw Material in Process, 16,000 lbs.....	1,429 11
Manufactured Goods, 2675 lbs.....	1,017 78
Labor on Raw Material in Process.....	380 59
Labor Packing, Labeling, etc.....	1 00
Labor on Finished Material.....	293 96
Wrapping Material Stock.....	1,853 90
Cost of Sales (deducted from Sales below).....	
Capital Stock.....	30,000 00
1st Mortgage, 6% Bonds.....	25,000 00
Accounts Payable.....	13,047 44
Provision for Bond Interest.....	125 00
Provision for Taxes.....	50 00
Provision for Depreciation.....	200 00
Surplus,—Jan. 1.....	5,000 00
Jan. Sales.....	9,819 00
Jan. Discounts.....	80 00
	9,899 00
	14,899 00
Less Cost of Sales.....	7,712 58
	7,186 42
	75,608 86
	75,608 86

• 10.1111/j.1467-954X.2007.00620.x

1. *U. S. Fish Commission*, *Report for the Year 1877*, Part I, pp. 1-2.

1
1.

15. *Leucosia* *leucostoma* *leucostoma* *leucostoma* *leucostoma*

1970-1971

1970-1971

1970-1971

1970-1971

TRIAL BALANCE OF THE COST ACCOUNTS

January 31, 1915

Finished Material Used.....	1,984 47
Labor on Finished Material.....	1,616 77
Flavoring Used.....	198 44
Interest on Plant.....	125 00
General Factory Expense.....	1,815 80
Wrapping Material Used.....	1,146 10
Labor Wrapping Used.....	239 20
General Office Expense.....	400 00
Administration	500 00
Selling Expense.....	750 00
 Manufacturing	 8,275 78
	\$8,275 78
	\$8,275 78

181. Guides to the Journal Entries. The following tables may serve to illustrate and act as a guide to the ordinary journal entries.

The tables given provide for the ordinary debits and their corresponding credits, and are divided into those applying to:

- (a) Specific Job Cost.
- (b) Departmental Cost.
- (c) Process Cost.

In the table for the entries concerning Process Cost, those entries applying only to the Complex Type will be noted thus: "(C.T.)."

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(A)

ENTRIES RELATING TO SPECIFIC JOB COST

DEBITS	AND USUAL CORRESPONDING	CREDITS
to		to
Accounts		Accounts

Accounts Payable.....	Cash
Accounts Receivable.....	Sales
Accounts representing overhead Used.	Overhead on Work in Process
Administration	Accounts Payable
Cost of Sales.....	Manufactured Goods
Depreciation	{ Reserve for Depreciation Accounts Payable
Discounts	Loss and Gain
General Factory Expense.....	Pay Roll
General Factory Expense.....	Accounts Payable
General Office Expense.....	Pay Roll
General Office Expense.....	Accounts Payable
Insurance	Unexpired Insurance
Interest	Provision for Interest
Labor on Work in Process.....	Pay Roll
Labor Used.....	Labor on Work in Process
Loss and Gain.....	Surplus
Manufactured Goods.....	Manufacturing
Manufacturing	Various Cost Accounts
Miscellaneous Labor.....	Pay Roll
Overhead on Work in Process.....	{ General Factory Expense Repairs and Renewals Miscellaneous Labor Power, Taxes, Rent, Ins. Depreciation Shipping Room Expense General Office Expense Administration Selling Expense
Pay Roll.....	Accounts Payable
Power	{ Pay Roll Accounts Payable
Provision for Interest.....	Accounts Payable
Provision for Taxes.....	Accounts Payable
Raw Material on Work in Process....	Raw Material Stock

(A)—Continued

ENTRIES RELATING TO SPECIFIC JOB COST

DEBITS to Accounts	AND USUAL CORRESPONDING	CREDITS to Accounts
Raw Material Stock.....	{ Accounts Payable Discounts	
Raw Material Used.....	Raw Material on Work in Process	
Rent	Accounts Payable	
Repairs and Renewals.....	{ Pay Roll Accounts Payable	
Reserve for Depreciation.....	Depreciation	
Sales	Cost of Sales	
Selling Expense.....	{ Pay Roll Accounts Payable	
Shipping Room Expense.....	{ Pay Roll Accounts Payable	
Unexpired Insurance.....	Accounts Payable	

COST JOURNAL ENTRIES

Cost of Sales.....	Manufactured Goods
Job No. 1 (say).....	{ Raw Material on Work in Process Overhead on Work in Process Labor on Work in Process
Labor on Work in Process.....	Individual Job Accounts
Manufactured Goods.....	Manufacturing
Manufacturing	Cost of Sales
Overhead on Work in Process.....	Individual Job Accounts
Raw Material on Work in Process....	Individual Job Accounts

STOCK JOURNAL ENTRIES

Raw Material No. 1 (say).....	Raw Material Stock
Raw Material Stock.....	Raw Material No. 1 (say)

164 PRINCIPLES AND PRACTICE OF COST ACCOUNTING

(B)

ENTRIES RELATING TO DEPARTMENTAL COST

DEBITS to Accounts	AND USUAL CORRESPONDING	CREDITS to Accounts
Accounts Payable.....	Cash	
Accounts Receivable.....	Sales	
Administration	Accounts Payable	
Administration Used.....	Overhead on Work in Process	
Cost of Sales.....	Manufactured Goods	
Department Expense.....	Pay Roll	
Department Expense.....	Accounts Payable	
Department Expense Used.....	Overhead on Work in Process	
Dept. Labor on Work in Process.....	Pay Roll	
Department Labor Used.....	Dept. Labor on Work in Process	
Discount	Loss and Gain	
General Factory Expense.....	{ Pay Roll Accounts Payable	
General Factory Expense Used.....	Overhead on Work in Process	
General Office Expense.....	{ Pay Roll Accounts Payable	
General Office Expense Used.....	Overhead on Work in Process	
Loss and Gain.....	Surplus	
Manufactured Goods.....	Manufacturing	
Manufacturing	Various Cost Accounts	
Overhead on Work in Process.....	{ General Factory Expense Department Expense General Office Expense Selling Expense Administration	
Pay Roll.....	Accounts Payable	
Raw Material on Work in Process....	Raw Material Stock	
Raw Material Stock.....	{ Accounts Payable Discount	
Raw Material Used.....	Raw Material on Work in Process	
Sales	{ Cost of Sales Loss and Gain	
Selling Expense.....	{ Pay Roll Accounts Payable	
Selling Expense Used.....	Overhead on Work in Process	

For original entries to nominal accounts, see under item (A), Specific Job Cost, just preceding.

(C)

ENTRIES RELATING TO PROCESS COST

DEBITS ————— AND USUAL CORRESPONDING ————— CREDITS

(Abbreviation "(C. T.)" means "Complex Type only.")

Accounts Payable.....	Cash
Accounts Receivable.....	Sales
Administration	Accounts Payable
Administration Used.....(C. T.)	Overhead on Finished Material
Assembling Expense.....(C. T.)	Various Expense Accounts
Cost of Sales.....	Manufactured Goods
Depreciation	Reserve for Depreciation
Discount	Loss and Gain
Finished Material (Stock).....	Raw Material in Process
Finished Material Used.....	Finished Material
General Factory Expense.....	{ Accounts Payable Pay Roll
General Fact'y Exp. Used....(C. T.)	Overhead on Finished Material
General Office Expense.....	{ Accounts Payable Pay Roll
Gen. Office Exp. Used.....(C. T.)	Overhead on Finished Material
Insurance	Unexpired Insurance
Interest on Plant.....	Provision for Interest
Interest on Plant Used.....(C. T.)	Overhead on Finished Material
Labor Assembling.....(C. T.)	Pay Roll
Labor Assembling Used.....(C. T.)	Labor Assembling
Labor on Finished Material.....	Labor on Raw Material in Process
Labor on Finished Material Used.....	Labor on Finished Material
Labor on Raw Material in Process.....	Pay Roll
Labor Wrapping.....	Pay Roll
Labor Wrapping Used.....	Labor Wrapping
Manufactured Goods.....	Manufacturing
Manufacturing	Various Cost Accounts
Overhead on Fin. Material...(C. T.)	{ Repairs and Renewals Rent, Dep., Taxes, Ins., Power. General Fact. and Off. Exp. Accts. Administration and Selling Accts.

166 PRINCIPLES AND PRACTICE OF COST ACCOUNTING

(C)—Continued

ENTRIES RELATING TO PROCESS COST

DEBITS—AND USUAL CORRESPONDING—CREDITS
to
Accounts to
 Accounts

(Abbreviation "(C. T.)" means "Complex Type only.")

Provision for Interest.....	Accounts Payable
Pay Roll.....	Accounts Payable
Raw Material in Process.....	Raw Material No. 1 (say)
Raw Material No. 1 (say).....	{ Accounts Payable Discount
Rent, Depreciation, Taxes, Insurance and Power.....	{ Accounts Payable
Rent, Depreciation, Taxes, Insurance and Power Used. (C. T.).....	{ Overhead on Finished Material
Repairs and Renewals.....	{ Accounts Payable Pay Roll
Repairs and Renewals Used (C. T.)..	Overhead on Finished Material
Sales	{ Cost of Sales Loss and Gain
Selling Expense.....	{ Pay Roll Accounts Payable
Selling Expense Used.....	Overhead on Finished Material
Taxes	Provision for Taxes
Unexpired Insurance.....	Accounts Payable
Wrapping Material Stock.....	{ Accounts Payable Discount
Wrapping Material Used.....	Wrapping Material Stock

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